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### 08 Sub-£50 Motherboards

A new motherboard can easily set you back hundreds of pounds if you go for the highest of high-end units, but most of us don't have the cash for that kind of thing. Thankfully, though, the budget end of the market has plenty of reasonably capable boards for less than £50. David Hayward has been looking at what's available for both AMD and Intel system builders, including even the very latest processor lines

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# Motherboards For Under £50

We look at eight value boards from both Intel and AMD camps, to see what you can get for your money

There's a lot to take into consideration when we're faced with buying a new motherboard. Do we opt for one that's already compatible with our current memory, CPU and graphics card, or do we go instead for the latest CPU socket type, memory and so on?

We also have to consider the huge list of features that modern motherboards have to offer. Do we want high-end gaming capabilities and overclocking support, and do we really need to insist on having military grade components?

Financially, of course, we want the best for our money too. It's the investment of the motherboard that dictates what you do with your PC for the remainder of its life – be that a gaming monster or a small media centre.

Here, we're looking at a selection of reasonably priced, sub-£50 motherboards from both Intel and AMD camps that will offer users a variety of potential setups. One way or another, our hope is that there'll be something within these pages that will hit the sweet spot of technology and price for those who are after their next motherboard upgrade.

## Intel

Starting with Intel, there's an exceptional line-up on offer these days. There are even Skylake boards for under £50.

Intel is generally regarded as the leading socket technology manufacturer at the moment, and it's been that way for a while now. AMD enthusiasts would probably disagree, whereas Intel supporters will claim the technology and performance crown. That, however, is not our concern right now; what matters is these great deals.

### MSI H81M-P33

For just £30 or thereabouts, this MSI micro-ATX board has a lot to offer those who want a power-packed but compact system.

It supports Socket 1150, up to fourth-generation Haswell Core i7 CPUs and DDR3 memory, with a pair of memory slots available on its tiny frame. You'll find VGA, DVI, two USB 3.0 ports and a four USB 2.0 ports, along with a pair of PS/2 ports and a three-port audio jack line-up.

There's also gigabit Ethernet, a PCIe x16 slot and a single PCIe





▲ The MSI H81M-P33 is pretty good buy for those after a small Intel system

x1 slot, two SATA-3 and two SATA-2 connections, and you get high-quality components throughout.

Speaking of the components, MSI, for a while now, has proudly offered military class 4 quality across its entire range of products. This, of course, means you'll have some of the best humidity, ESD (electrostatic discharge), EMI (electromagnetic interference) and high temperature protection found on any motherboard currently available.

“ There’s a lot to take into consideration when we’re faced with buying a new motherboard ”

Plus you also get a better lifespan from the components, measured in decades if the PC is used under ‘normal’ office duties and there’s more scope for a spot of overclocking should you ever fancy tweaking a little more out of your installed processor and memory.

Another interesting feature of the MSI H81M-P33 is the Click BIOS 4, the latest UEFI BIOS that’s optimised for Windows 8.1 and beyond. It’s extremely simple to use, very clear and makes more elaborate setups a little easier to get to grips with, especially when you start to fiddle with overclocking and other such intricate details.

It’s certainly a good, small and well priced motherboard. However, it gets a little cramped when you start to load it up with memory, a graphics card, a decent cooler and so on. On the other hand, if you’re looking for a motherboard that can deliver a decent level of performance for media duties and even a spot of lightweight gaming, then the MSI H81M-P33 has all the essential features you’ll need.

If you want more information, then have a look at the MSI site at [goo.gl/5Socgz](http://goo.gl/5Socgz).

### Asus H110M-D D3

It’s another micro-ATX board again, but this time we’re looking at one that can support the new Skylake S ocket1151 processors from Intel.

The new Skylake socket has just one more pin than the former Haswell architecture, with performance gains and a vast

improvement on power efficiency and battery life. It also supports DDR4, as well as a maximum of three SATA Express x2 port or four M.2 connections. It’s the sixth-generation of Intel processors, so it’s pretty up to date in terms of what’s currently available.

We’ve seen the Asus H110M-D D3 priced as low as £45, but you may be able to find a better deal if you’re willing to shop around for a while. However, less than £50 isn’t too bad for getting hold of the latest socket technology.

On-board you’ll find a pair of DDR3 slots (unfortunately not DDR4), a single PCIe x16 slot and a pair of PCIe x1 slots, along with four SATA 6Gbps connectors.

The rear IO plate consists of one single PS/2 combo port, VGA, HDMI, gigabit Ethernet, two USB 3.0 and two USB 2.0 ports. There’s the standard three-audio jack arrangement and oddly a parallel and COM port.

The addition of a COM port and LPT1 parallel port may seem like a curious throwback from the late 90s era of desktop computing, especially on a modern socketed motherboard, but there are always situations where these ports can come in handy, even nowadays.

But the Asus H110M-D D3 isn’t just for users who still have a computerised HAM radio mast attached to the back of their computers. The many features of this board include gaming quality audio, as well as high-quality components designed to protect the board from electrical surges, over-voltage, ESD, humidity and so on.

On top of that you also have the micro-ATX form factor, so there’s plenty of scope for this being a media PC or lightweight gaming machine (although probably not as good in terms of performance as the MSI H81M), and thanks to the COM and parallel ports, an interesting project PC.

For more info, head to [goo.gl/UQCHz3](http://goo.gl/UQCHz3).

### ASRock H61 Pro BTC

BitCoin mining was, back in 2010, considered a worthwhile pastime for those who had the power of a decent machine to dedicate to generating the valid hashes. These days, it’s a little more difficult, given the costs of running an individual mining operation, the cost of electricity and the fact that generating a valid hash is now extremely rare.

To be honest, BitCoin mining was something we never got into, so we’re far from being experts on how it’s done. However, despite the limiting factors of BitCoin mining these days, there



▲ The Asus H110M-D3 is one of the first Skylake boards for under £50



▲ If mining for Bitcoins is your 'thing', then this example from ASRock will suit your needs

are still motherboards available that are designed with that purpose in mind.

Of the many, ASRock's H61 Pro BTC was one of the first available. It's a Socket 1155 motherboard with support for third-generation Intel CPUs and comes with a pair of DDR3 memory slots, a single PCIe x16 slot and five PCIe x1 slots. Obviously, the point is to use the GPU-based processing to mine for Bitcoins.

The IO port at the rear of the board is home to six USB 2.0 ports, a pair of PS/2 ports, HDMI, VGA, gigabit Ethernet and the three audio jack block. Internally, you have just four SATA-2 connectors, SLI/Xfire connectors and another couple of USB 2.0 headers.

Objectively speaking, the ASRock H61 Pro is a bit of a dinosaur compared to more modern motherboards, despite it being only a year and a half old. It was released at a time when mining for Bitcoins had dwindled to a point where it was unprofitable for the individual to gain anything and when GPU mining was on its way out.

However, that's not to say it's not a decent motherboard that can be turned to other uses. The quality of this ASRock board is quite exceptional, and you get ASRock's own version of multi-level protection against humidity, ESD, overheating and other such problems.

While you might not necessarily use it on your own for Bitcoin mining, the board is certainly going to be of use to you if you're a part of a larger organisation of miners, who combine their processing power and split the profits. It's still a long shot as to whether you'll make any decent profits to offset the power consumption and initial expense, but if that's what you're into, then this board could be worth checking out.

You can find more information at [goo.gl/nHGMhm](http://goo.gl/nHGMhm). Expect to pay somewhere in the region of £48 for it.

#### **Gigabyte GA-B150M-D2V**

The last Intel board we'll look at here is another sixth-generation product that manages to creep in at £49.99, depending on where you shop.

To get a Skylake motherboard in at less than £50 generally requires some corners to be cut, as we've already seen in the Asus H110M. But again that doesn't necessarily mean that the motherboard in question isn't any good; you'll just lack the likes of DDR4 and M.2 support.

#### **Other Intel Motherboards**

Some other notable mentions from the Intel camp include:

**Biostar H61MGV3:** Although fairly uninspiring, this Biostar product comes in at around £30 and supports Socket 1155 CPUs.

**ASRock H61M-DGS:** A relation to the ASRock H61 Pro BTC, this £35 motherboard comes with a decent 5.1-channel audio setup.

**Biostar H81MGP2:** Speaking of audio, this is a surprisingly good £38 motherboard with eight-channel audio and Socket 1150 support.



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▲ Another Skylake motherboard, this one has a lot to offer for the price

## “ Intel might have the upper hand in terms of new technology, but AMD still has plenty to offer ”

The Gigabyte GA-B150M-D2V is a surprisingly good micro-ATX motherboard that can handle Socket 1151 CPUs. There are a couple of DDR3 memory slots available, a single PCIe x16 slot, two PCIe x1 slots and six SATA 6Gbps connectors.

The rear IO port boasts a pair of PS/2 ports, VGA, DVI, four USB 3.0 ports, two USB 2.0 ports, gigabit Ethernet and the standard three block audio setup. Sadly, there's no HDMI in this instance.

Other features include a high-quality audio design, with specialised audio capacitors and an electronic noise guard to prevent interference from other components. You'll also find a better than average traffic management Ethernet port, ideal for online gaming, and there's extra emphasis on tweaking the clock speeds and boosting the performance of the installed CPU and GPU.

Overall, it's a pretty good motherboard and a decent springboard to the newer line of processors from Intel. As we said, though, you're not going to get DDR4 or M.2 support in this instance or some of the other modern benefits that Skylake is offering. But for less than £50 you've got a performance motherboard that's small enough to tackle a number of different tasks with relative ease.

If you're interested in finding out more, the specifications can be found at [goo.gl/9vJvOY](http://goo.gl/9vJvOY).

### AMD Motherboards

The other side of the motherboard coin comes in the form of AMD processors. Intel might have the upper hand in terms of new technology, but AMD still has plenty to offer, even if it may appear to have stalled for what feels like years now.

As it's always been, you generally get faster clock speeds and more features for your money when it comes to AMD, but as Intel fans will no doubt be able to explain, those things don't necessarily equal greater performance. Again, though, that's a discussion for another time.

### Gigabyte 78LMT-USB3

This is a micro-ATX, 244 x 244mm board that utilises the AMD AM3+ FX/AM3 Phenom II range of processors on Gigabyte's Ultra Durable 4 Classic setup, which protects the valued components against such things as humidity, electrostatic interference, power failure and high temperatures.

The board consists of four DDR3 slots for up to 32GB of dual-channel memory, one PCIe x16 slot and one PCIe x1 slot. There are also six SATA-2 ports, an IDE connector, eight USB 2.0 and four USB 3.0.

The IDE connector is a blast from the past, and it's the level of legacy support that could potentially make this board quite appealing. For example, there's no UEFI here, just a plain old Award BIOS.

There are more modern connections as well, such as HDMI and the aforementioned USB 3.0, and the on-board graphics, in the form of a Radeon HD 3000, do a decent enough job of providing good desktop visuals and HD content, although serious gaming is out of the question. However, it's the fact that this board can support a mix of both older hardware and relatively newer stuff that sets it aside. Linux users who are sick to the back teeth of having to do the UEFI dance every time they fancy trying a new distro will certainly appreciate its absence. Likewise, those with IDE drives will also praise this board's ability to bring back their data from a dusty grave at the bottom of a desk drawer.

Naturally, you can pack this board with an FX 8320 Black Edition 3.5GHz eight-core CPU, 8GB of 1600MHz RAM, an SSD and an R9 280 3GB graphics card, and it will certainly fly, allowing you to play the latest games. Not bad for a board that's just a tad under £41.

So although legacy users can enjoy the benefits of the 78LMT-USB3, so too can budget gamers or system builders. The lack of an advanced UEFI also makes overclocking more accessible, at least in a sense that you can do things the way you used to before everything went the way of Extensible Firmware. And the Ultra Durable 4 technology makes for a good platform to experiment with, using one of the more robust AMD processors.

In short, the Gigabyte 78LMT-USB3 certainly won't set the world alight with its advanced technologies. But for the sake of building a stable system that can support the best that the old tech and new tech has to offer, it has a lot going for it,



▲ The presence of an IDE port may be handy for some legacy users



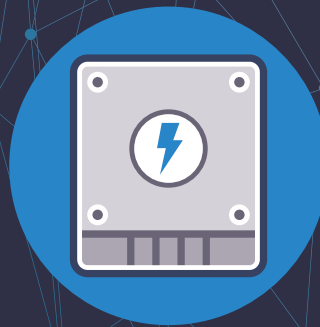


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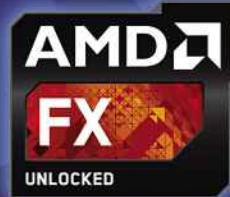
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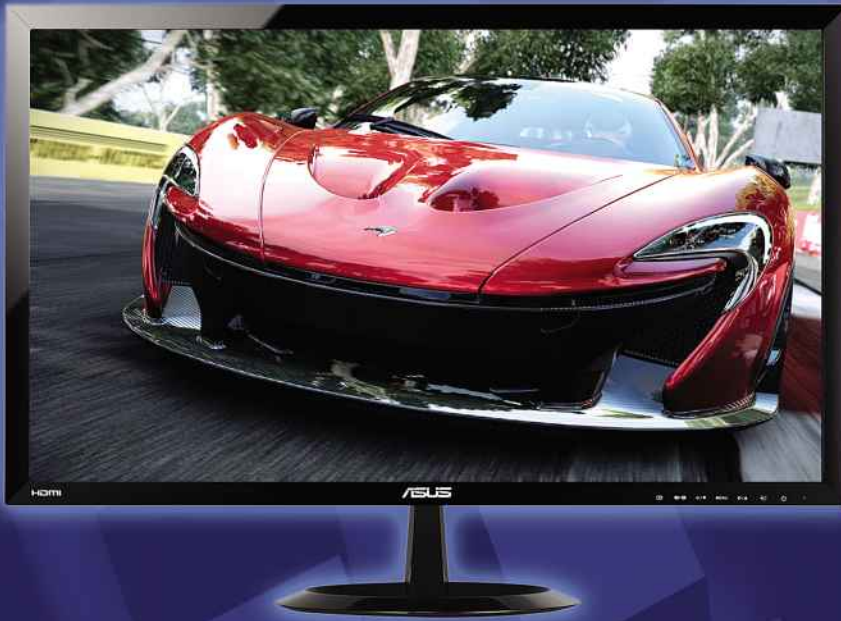




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▲ The ASRock FM2A88M Extreme4+ is a great AMD based motherboard

and it won't break the bank either. However, the lack of certain aspects, such as SATA-3 and support for faster SSDs, may force users to look elsewhere.

For further information head to [goo.gl/TH19Rq](http://goo.gl/TH19Rq).

#### ASRock FM2A88M Extreme4+

This particular motherboard was the first from ASRock that supported the AMD A-series Kaveri APUs. It's quite a feature-rich board with four DDR3 memory slots, two PCIe x16 slots (one in x16 mode, one at x4), a PCIe x2 slot and a further legacy PCI slot, which means it supports dual graphics, for high-end gaming builds. And you'll find eight SATA-3 6Gbps connectors as well.

There's a PS/2 port, VGA, DVI, HDMI, optical S/PDIF out, four USB 2.0 ports, two USB 3.0 ports, gigabit Ethernet and a five-port audio block. On top of all that, you also get the Gigabyte high density glass fabric PCB and all solid capacitor designs, which combine to make an excellent quality motherboard.

Although it may seem a little long in the tooth these days, despite being less than two years old, the ASRock FM2A88M Extreme4+ is an incredibly capable motherboard. There's no reason why you can't fit an FM2+ A10 Pro along with a modern GTX970 or AMD R9 390 Gaming 8G and have a fairly impressive gaming system. Likewise, since it's still only a micro-ATX board, there's a fair amount of performance here for a very good media centre.

The FM2A88M Extreme4+ is a pretty good buy for those who want a lot of technology for their money. It's available for around £49.99, but you may be able to find one going for a few pounds less if you shop around.

There is one thing that you may need to consider, though: while very good in almost every way, there's not a huge amount of clearance between the CPU and memory slots. So if you're planning on fitting a bigger cooling solution, you may need to just take a moment to measure the distance first. Overall, though, you should be okay with more standard cooling setups.

More information can be found at [goo.gl/XlnlqP](http://goo.gl/XlnlqP), including the current CPU support list.

#### Gigabyte GA-F2A68HM-HD2

The Gigabyte GA-F2A68HM-HD2 is an FM2+ board for AMD processors up to the A10-7850K, with an AMD A68H chipset, a pair of DDR3 slots and expansion slots in the form of one PCIe x16, one PCIe x1 and a legacy PCI slot.

The back IO panel features two USB 3.0, four USB 2.0, HDMI, DVI, VGA, three audio jacks, a PS/2 port and gigabit Ethernet. And there are four SATA-3 6Gbps connections on board, along with an S/PDIF out header.

Gigabyte has upped its game in the quality department in recent years – enough to put the wind up the likes of MSI, at least. This is apparent with this model, as you'll find solid capacitors throughout, high-quality Nippon Chemicon ARE series audio capacitors, humidity protection and protection from power failure, surges and electrostatic charges. This is another one of the Ultra Durable 4 Plus range of boards, so you can expect a pretty solid base on which to build your next system.

The support for Godavari and Kaveri processors means you have a pretty decent selection to choose from and a selection that's not too bad when it comes to building a capable gaming PC too. Of course, you could always opt for the older Richland and Trinity AMD processors and up the clock speed through some clever overclocking. Suffice to say, you get a stable foundation on which to build your system on.

“ Intel is generally regarded as the leading socket technology manufacturer at the moment, and it's been that way for a while now ”

Either way you look at it, the Gigabyte GA-F2A68HM-HD2 proves to be a motherboard that punches well above its weight. And at an average price of £39, it's cheap enough to consider for a number of applications.

Despite its micro-ATX form, the board doesn't feel too cramped. Granted, there's not a lot of room between the PCIe x16 and x1 slots, especially if you fit a dual slot graphics card in there (depending on the card, you probably won't have access to the PCIe x1 slot at all), but you should be able to get access to the legacy PCI slot without too much trouble.



▲ This example from Gigabyte offers a lot for system builders on a budget





▲ This ITX board may be niche, but it's ideal for those after a small media centre build

The same goes for the positioning of the memory slots and the CPU socket, in that there's probably just enough room for a bigger cooler and slightly higher RAM sticks to coexist without touching or creating a hazard for other cooling solutions.

For the motherboard overview and specifications, as well as the CPU support list, the details can be found at [goo.gl/lrSeNa](http://goo.gl/lrSeNa).

#### MSI AM1I

If it's a really cheap but still perfectly effective motherboard you're after, then look no further than the MSI AM1I.

This mini-ITX board costs just £24, but it comes with support for Socket AM1 Athlon and Sempron Kabini CPUs, a single DDR3 memory slot and one PCIe x16 slot. There's a pair of SATA-3 6Gbps connectors, though, and the rear IO ports include two PS/2 ports, HDMI, VGA, DVI, two USB 3.0 and two USB 2.0 ports, gigabit Ethernet and a three-block audio setup.

Naturally, it's not the kind of motherboard you'd opt for if you're planning on building a gaming machine, but for media duties (thanks to its size) it's more than capable. We actually used one of these in a custom arcade cabinet, running Windows 7 and a copy of MAME from an SSD, and it was a superb setup that cost less than £100 for everything.

Another aspect is the fact that it runs quietly, with the right cooler and processor, and it doesn't get too hot either. Also, because it's an MSI board, you get the usual military class 4 components and higher-quality development than you'd normally find on some of the competition's motherboards.

Admittedly, it is a little niche in some respects, but if you have a project in mind where a small ITX computer will shine, then this could well be the board that ticks all the right boxes.

For more information, check out [goo.gl/sNkPDU](http://goo.gl/sNkPDU).

#### Conclusion

Obviously there are countless more Intel and AMD motherboard available for less than £50, but unfortunately we don't have the space to fit them all in the magazine.

The selection we've looked at here span a number of potential projects and capabilities, so hopefully somewhere in the list you'll find a motherboard that'll suit your needs. And if it's a little more performance you're after or a bit more technology, you can instead go a tad higher to the £75 mark and find a surprisingly excellent choice of motherboards on offer. [mm](#)

#### Other AMD Motherboards

As with the Intel motherboards, the same goes for AMD. Here are a few that are worth mentioning, but we never had space for in the main article:

**Biostar AM1ML:** If you thought the MSI AM1I was cheap at £24, think again. This equivalent Biostar motherboard will set you back less than £20.

**MSI A68HM-P33:** This MSI motherboard is extremely capable at a reasonable £35.

**MSI A88X-G41:** Although tipping the scales at £50, this is an extremely good AMD motherboard and well worth looking into.



# SSD Optimisation

**SSD volumes are fast and efficient, but how do you ensure you're getting the most from them? Aaron investigates**

**S**olid State Drives have been around for some time now and, while the tech is still very expensive compared to traditional (mechanical) drives, more and more people are living with the smaller capacities they offer in order to enjoy their advantages. SSDs are much faster, more efficient and silent. They use less power too. SSDs are still a more specialist item than a mechanical volume, though, and not everyone knows how to get the most out of one.

SSDs, for example, are limited in terms of rewrites. That, combined with the generally lower capacities, means that they need to be used with care if you want to get the most for your money. SSDs shouldn't be used selectively, at least not until the technology drops in price to something comparable to a mechanical drive.

At the moment, you're best tailoring your system to maximise your SSDs capabilities and usefulness, and this is what we're going to look at over the next few pages. We'll cover the best ways to utilise the power of your SSD, how to increase its speed and lessen the wear and tear. So, let's begin.

## Keep In TRIM

We'll start with the big one and that's TRIM. This is a very important feature of SSD technology; without it, SSD disks can quickly become much slower than they should be. The reason for this is down to how solid state storage chips handle the deletion and overwriting of data.

A 'traditional' mechanical drive handles this in a simple manner: when files are deleted, Windows (or your chosen OS) goes to what is effectively its contents list, removes references to the data and marks the space as not in use. The data actually remains *in situ*, but the markers that point to it are gone. When the space is needed, the drive simply overwrites the data. Easy.

SSDs are different. Like mechanical drives, the OS will remove directions to the deleted data and mark the space not in use. However, SSDs cannot simply overwrite the existing data when the space is needed. First, the data must be physically deleted and *then* the new data written. This adds time to the whole data handling process, slowing the drive down considerably – which is where TRIM comes in.



```

C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\Aaron>fsutil behavior query DisableDeleteNotify
DisableDeleteNotify = 0

C:\Users\Aaron>

```

▲ Activating TRIM in Windows 7 and up is easy

TRIM is a special command that runs alongside the deletion command. When you delete a file from an SSD, the TRIM command is also triggered. This automatically goes and deletes the data you've just deleted, instead of leaving it to be removed when the space is needed to be written on. When you come to write to this space, TRIM has already deleted the data, so the SSD can write to it as if it was never used, thus keeping the speedy performance. Nice, eh?

## “ SSDs cannot overwrite existing data when the space is needed. First, the data must be physically deleted ”

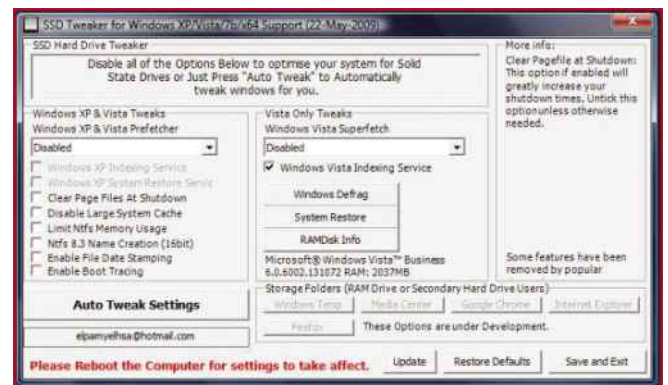
'Why doesn't everyone use this all the time?', you may ask. Well, there are limitations to TRIM, and for various reasons, it isn't always activated by default. The main limitations here lie with the currently installed OS and the SSD's firmware. Support for it is only included as default in Windows 7 and upwards, older editions of Windows can only provide TRIM via the use of third party software and drivers. These have to be manually added by the user, and many don't know how to do this, or even know what they're missing.

The SSD's firmware also needs to support TRIM. This probably won't be a problem for newer models, but some older units may lack this functionality. It's always worth check that a model you're interested in buying supports TRIM. It's a definite deal breaker. If it's an older model, always ensure you're running the latest firmware.

If you're using Windows 7 and above, TRIM is easy to use, but first you should check to see if it's already in operation. To do this, open up an administrator command prompt and then type 'fsutil behavior query DisableDeleteNotify' and press Return. This command will return one of two answers, either 0 or 1. If the result is 0, TRIM is enabled, so you don't need to worry. On the other hand, if 1 is the answer, you'll need to enable it. To do so, in the command prompt, type:

```
fsutil behavior set DisableDeleteNotify 0
```

And press Return. That's it. TRIM should now be running. The best way to use TRIM is to upgrade Windows to at least Windows 7. Third party programs will be useful, but having an OS that natively supports TRIM is far better, so if you're on the fence about upgrading, now may be a good time to jump over to greener pastures.



▲ SSD Tweaker can be used to enable TRIM on older operating systems

If you're still running a Windows version older than 7, such as XP, you'll need to see if your drive manufacturer has a utility for TRIM support. Intel has one ([intel.ly/1UZYqSt](http://intel.ly/1UZYqSt)), so does Crucial ([www.crucial.com/usa/en/support](http://www.crucial.com/usa/en/support)). If you can't find an official upgrade to enable TRIM, you may have to use third party software, such as SSD Tweaker ([www.elpamsoft.com](http://www.elpamsoft.com)). This is a specialised tool that has a host of SSD functions, including TRIM support for older operating systems. However, avoid some functions, such as defrag (we'll go into this later). If you're using a Mac, you can also get TRIM software to help, such as Trim Enabler from Cindori ([www.cindori.org](http://www.cindori.org)).

## Organise Your PC

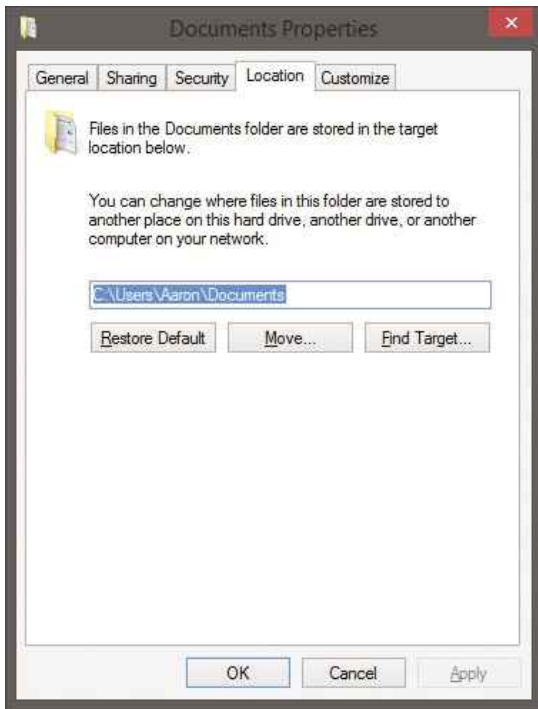
Alongside TRIM, organising your PC and data is paramount to the optimum performance of an SSD. This includes a selection of tasks which begin with the setup of your PC and the configuration of your Windows install and drives. By far the most popular and successful method of getting the most from an SSD in this regard is using the SSD volume to host Windows and moving other programs and data to a mechanical drive. This is almost universally appreciated as a great way to ensure you have a fast PC and that you're making the most of your SSD.

The reason for this is simple. The most active and used files on your PC will always be those of your OS. It's always running and working away the background. As these are always needed, it's best to have this data on the faster drive so that your OS is fast too and can do what it needs with speed. Other programs, such as office suites, browsers, games, creativity suites and so on aren't as essential and rarely contribute to the speed of your PC. You'll also rarely need access to these programs and files to be as quick, so they're best installed and housed on the mechanical drive.

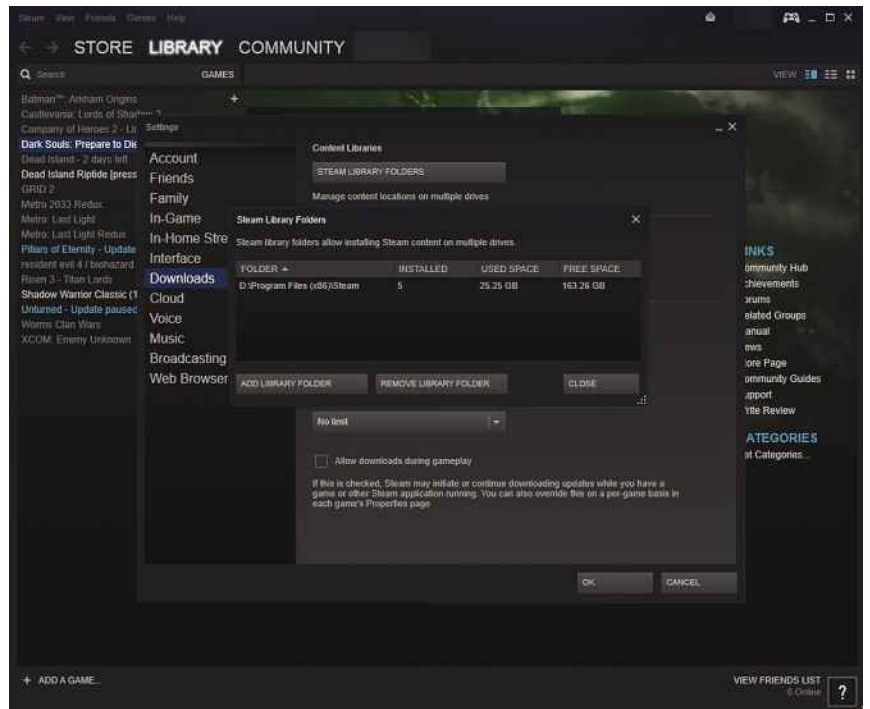
## Reusable?

In the early days of SSDs, before people were more familiar with them, it was a big fear that drives were very limited in terms of rewrites. This is an actual fact; SSDs do have a limited amount of rewrites, after which the drives start to fail. The technology has come a long way, though, and today's volumes are unlikely to show failures for a very long time. In fact, most SSDs will easily match mechanical drives in terms of lifespan, if not outlive them.

Don't panic about this if you're considering buying an SSD. Even without the steps we advise, a drive will last a very long time. It can't hurt to take precautions, though, to extend the life of the drive even more.



▲ You can move some user folders to another drive with ease



▲ Don't forget to change default download locations of apps like Steam so they don't spam your SSD

You could argue that more important programs, such as anti-virus, firewall, and other system-level utilities would benefit from SSD location, and this may be true, so it's really up to the user on this. The more activity there is activity on the SSD, the slower it will run; it's about balance.

In fact, some believe that the SSD should hold all of your installed programs and games, leaving the mechanical drive(s) for data only. Again, it depends on what applications you want to run quickly, and how much you value entire system speed over application speed, it also comes down to your uses.

## “ Symbolic links trick Windows into thinking a program is installed at a certain location ”

For example, a gamer will obviously benefit from using an SSD for game installs, as games will run faster and perform better thanks to the faster data access speeds. An artist would value this speed with greedy apps like Photoshop, while a casual user wouldn't really notice much difference from running a browser on an SSD. It all comes down to weighing the pros and cons against your PC use. Whichever way you go, though, always ensure your OS is on your SSD, that's a given.

Although we recommend you run Windows from an SSD, using mechanical drives for other things, this doesn't mean all of Windows. There are aspects of Windows you can – and, if you want a speedy PC, should – move off the SSD. This includes the standard document and data files associated with your account. These folders, such as Documents, Videos, Pictures and so on, can be easily moved and relocated away from the system drive. You can do this by simply right-clicking on the folder in Explorer and

going into Properties. Click Location and use the Move option to relocate the folder(s) to a separate drive. This will change the path within Windows, keeping this data away from the SSD.

When installing programs and games, always use the custom option and change the install location from the default, which will almost always be the OS volume, to another drive. If programs use the Windows folder, Program Files, a new one will be created, along with the full path.

With services like Steam, you'll need to go into the application options and change the default location for games. You'll be able to do this via the Setting menu, in the Downloads\Steam Library Folders section.

It goes without saying that you should also manually move and save future data to another drive. So, don't use your SSD for collections like music or videos, and this takes up a lot of space. For SSDs to run at optimum, they need space to work. If they get too full, they'll begin to slow down, just like any other drive. As you're running your OS on this volume, you want to avoid this.

## Symbolism

If you're reading this and already have an SSD and you've got a lot of installs already, you may be wondering how to change this quickly. The most straightforward option is to uninstall and reinstall programs onto another drive, but there's another route you can take. You can use symbolic links.

Symbolic links are specially created links that trick Windows into thinking a program is installed at a certain location, even after it's been moved. Usually, simply cutting and pasting a program's directory to another location will cause the program to stop working, as Windows and its Registry will be looking for the old location, meaning you have to 'trick' it.

These symbolic links are created using the command prompt (admin). The command we need is 'mklink.' This is used to make a new link for an existing program, redirecting Windows in the process. So, let's say you have a program installed in 'C:\Program



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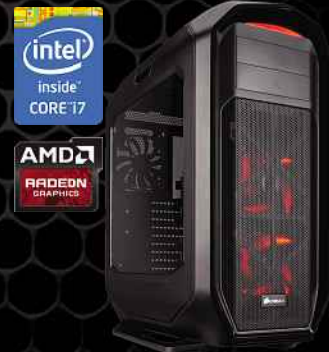
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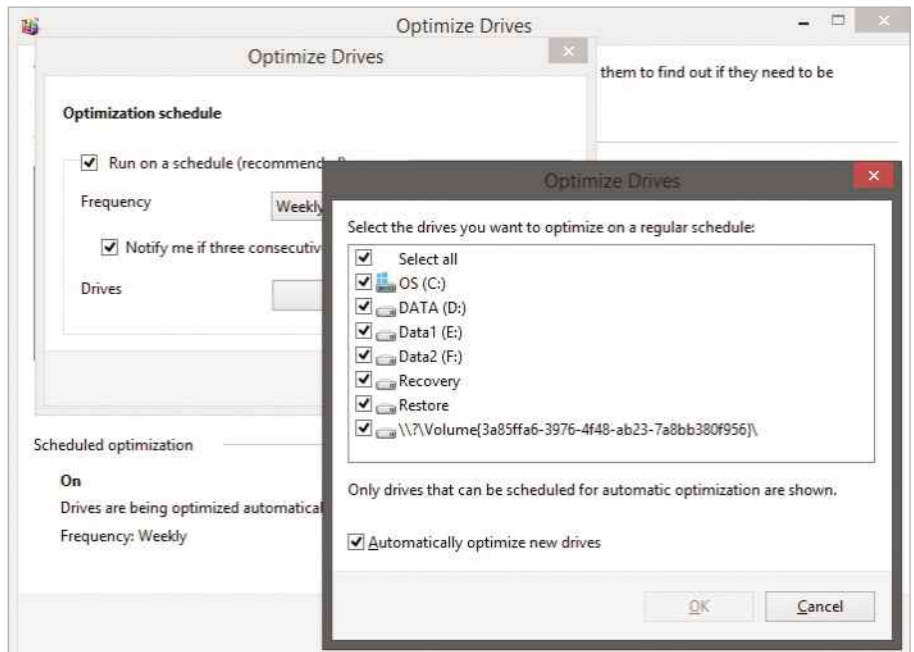
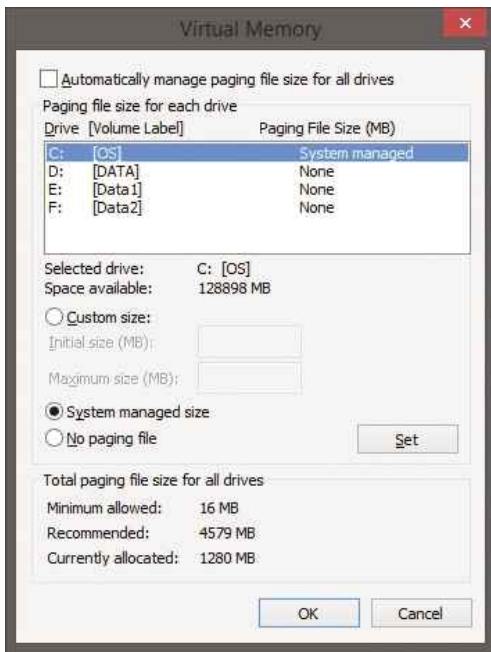
OVERCLOCKING BUNDLES



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▲ Move your page file to another drive and keep your OS SSD speedy

▲ Don't defrag SSD volumes and ensure you disable auto optimise in Windows

Files\TESTAPP' and want to move it to the E: drive, you use this method. First, copy and paste the folder in question to the new location, then open up an admin command prompt. Once it's open, use the mklink command to redirect Windows as follows:

```
mklink /d C:\Program Files\TESTAPP E:\Program Files\TESTAPP
```

You'll need to change the source and destination paths to your own, of course, but once done Windows will now look for the program in the new location, not realising you've simply moved the folder. The old one can be deleted.

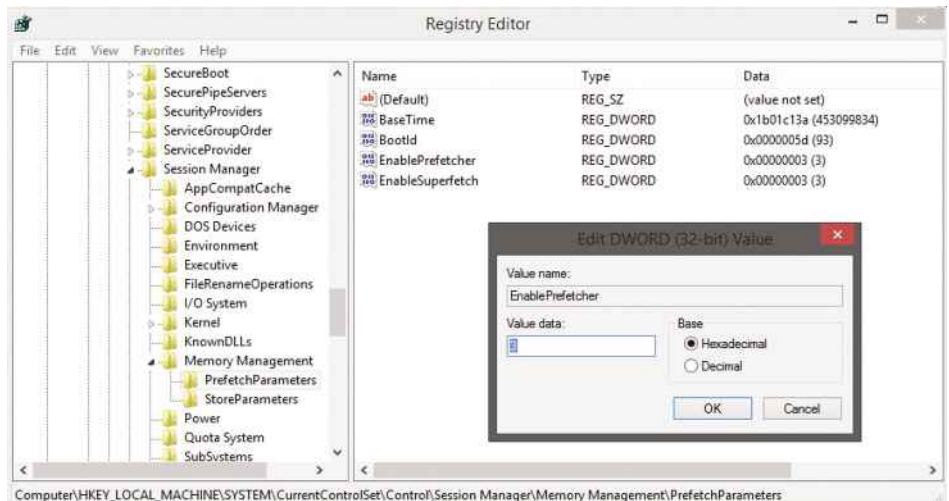
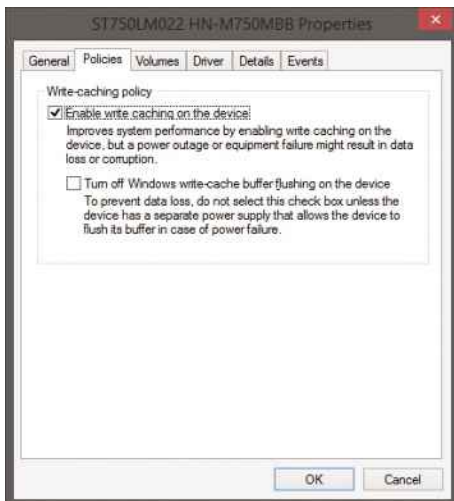
## Flipping The Page

The Windows page file is another system feature that's essential for the speedy operation of a PC, but it's also a problem for SSDs as it not only takes up space, but also speed and resources. For these reasons it's best to move this off the SSD and place it on a mechanical drive, or another SSD volume that doesn't have the OS on it as well.

Moving the Windows page file is easy. To do this, open up Explorer and right-click My Computer/Computer and select Properties. Go to Advanced Properties and then into Advanced and Performance Settings. Click Advanced again, and under Virtual Memory click Change.

The page file management screen will open. If everything is greyed out, untick the first option 'Automatically manage paging file size for all drives.' This will activate the other options, and you can use these to move the page file and change the amount of space allocated to it.

To move the file, highlight the SSD volume (probably C if it's your OS volume) and select the option for no paging file. Now, highlight another drive, such as your mechanical storage drive, and select either a system-managed file or choose a custom file and specify the amount of space to use. Once you're done, click OK. This will remove the page file on the OS drive, and instead use another drive for the function. This way, you keep the essential features of the page file, but aren't taxing the SSD at the same time.



▲ Disabling write cache can help some SSD users

▲ Disable Superfetch and prefetch if you're using an SSD



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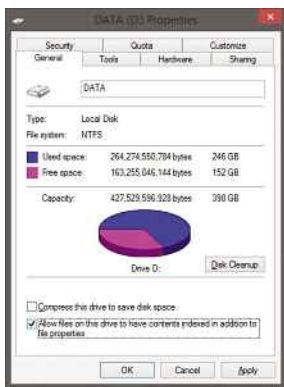


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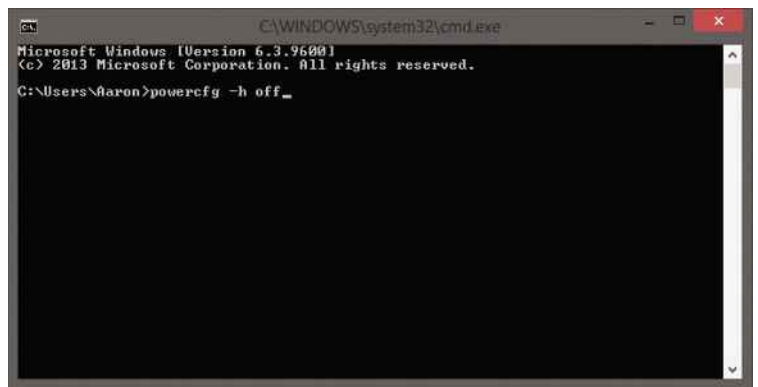
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▲ Indexing is not really needed, so disable it



▲ System Restore takes up a lot of space – a problem for smaller SSDs



▲ You may not need to use sleep or hibernate with an SSD, so can disable it

## Defrag Is Bad

Defragmenting a hard disk is one of those tasks people always recommend. It's been a staple tip for making PCs faster for years. These days it's less of a problem, as later versions of Windows are better at handling data, and defrag is often run automatically by default, meaning we really don't have to worry about it. At least, you don't if you have a mechanical drive. With an SSD, you have to train yourself to ignore advice from the past.

SSDs should never be defragmented as this will have little effect on them, as they operate differently. They're not mechanical platters that need to move data around to make access faster, they have solid state memory chips, which isn't affected in the same way. More importantly, defragging a solid state drive simply uses a lot of writes and re-writes. As we mention in the box outs, this isn't the major worry most feel it is, but it's always best to limit writes as much as you can to ensure a longer life for the drive. For this reason, you should turn off defrag for your SSD drive.

To do this, right-click the drive in question and go to Properties > Tools > Optimize. The defrag tool will open and shows your various drives. Highlight the SSD volume and click Change Settings. Now, you can remove the tick next to the option 'Run on a schedule (recommended)', but this will deactivate defrag for all drives, and you may still want to defrag mechanical volumes. So, instead click the button to choose drives. Untick the SSD drive, but leave the others and click OK. This will stop Windows from trying to optimise and defrag the SSD.

## SSD Tweaks

As well as the procedures we've covered, there are some tweaks you can make to your system that can further optimise your SSD. These tweaks are varied, but all should help you get the most out of your SSD drive.

### Disable Write Caching

Some would argue that this feature should actually be enabled, and doing this will boost an SSD's performance. This may be so in some cases, but write caching is actually more for mechanical drives, helping cache the data written to them. With SSDs, write speeds are already so fast, it's a feature that doesn't actually help all that much, and disabling it can take some stress off the unit.

To do this, go to Control Panel > Device Manager. Expand Disk Drives and right-click on your SSD volume. Click the Policies tab and you'll see the write caching entry, which is probably ticked. Untick this and click OK.

### Disable Superfetch And Prefetch

Superfetch and prefetch are functions that tell Windows to load soon-to-be-needed data into memory in order to speed up proceedings. This is a very useful feature for slower, mechanical drives, but SSDs are so fast in practical terms it's just not needed. In fact, it can actually have a negative effect on performance, as it unnecessarily takes up memory and resources. So, we'd recommend you take a moment to make sure it's disabled. To do this you'll need to enter the Registry Editor and tinker with it a little.

Open Regedit by typing 'regedit' in the search or run bar. When in the editor, navigate to HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\Memory Management\PrefetchParameters.

When you're there, double-click the EnablePrefetcher and EnableSuperfetch entries on the right, and set their respective values to 0.

## SATA Matters

The SATA interface used to connect disk drives to a PC can affect the speed of a drive, especially SSDs, although depending on your setup, this effect will vary in intensity. Most modern PCs and motherboards will have support for 6Gbps SATA (SATA-3), while older models will still be using SATA 3Gbps (SATA-2). Even new motherboards may not be entirely 6Gbps and may mix in 3Gbps ports.

Going by the numbers alone, you can see that the difference is twice the speed for 6Gbps SATA connections, so you'd expect the difference in speed to be vast. In truth, this is usually not the case.

Older, mechanical drive performance hasn't changed much over the years, and most models simply cannot make full use of the 6Gbps speed due to physical limitations (limited I/O requests and simultaneous streams). SSD, on the other hand, can make use of the higher speeds, as these drives are far faster and able to access more data at any one time.

That said, don't expect enormous boosts moving from 3Gbps to 6Gbps. There is often a speed increase, that's true, but in many cases it's not all that much, and an SSD on 3Gbps is still very fast and perfect for most users. If you have spare 6Gbps SATA ports, though, always connect your SSD drives to these and use the older 3Gbps ports for mechanical volumes.





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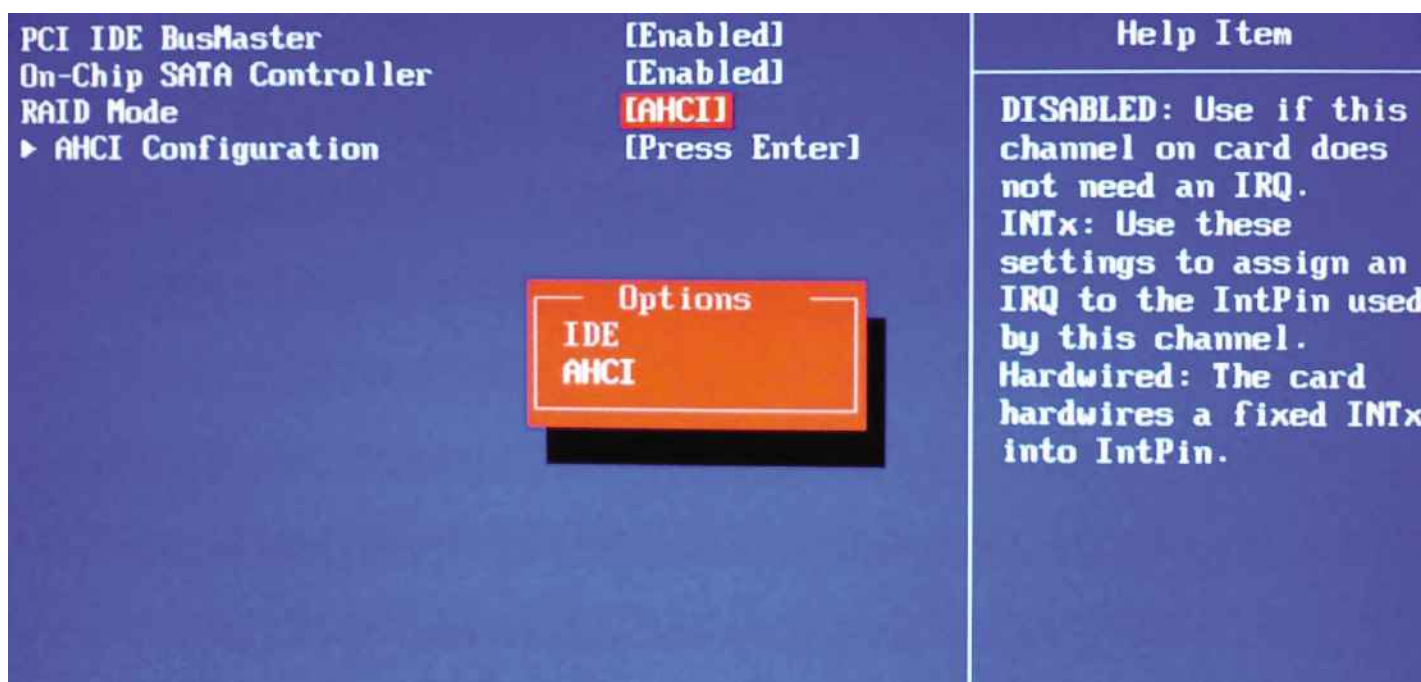
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▲ Ensure you use AHCI SATA for your SSD drive(s)

### Disable Indexing

Like prefetch and superfetch, indexing is another feature designed to speed up Windows' data access. It does this by telling Windows to store the most commonly used files in memory for faster access. With SSD, this isn't such a problem, and it'll take up system resources you don't really need to use. Disabling it frees up these resources, giving your whole PC a speed boost.

To disable it right-click your SSD drive in Explorer and go to Properties. Click the General tab and untick the option 'Allow files on this drive to have contents indexed' and click OK. Simple.

### Disable System Restore For SSD Drives

System Restore isn't a big bad monster, it's actually very useful, and you'll be glad you have it in a pinch. It can be a problem with SSD drives, though, as they are generally much smaller in terms of capacity compared to normal Mechanical drives. System Restore images can take up precious space, so disabling the feature for SSD volumes can be a help. Just make sure you appreciate the risks of doing so.

To disable System Restore on an SSD right-click Computer and go into Properties. Go into System Protection and highlight your SSD. Click the Configure button and select the option to disable System Restore and click OK.

### Hibernate Instead Of Sleeping

Using sleep on a system saves the current state to RAM before it goes to sleep, making for a speedy reboot back to where you were. Hibernate is similar, but instead saves the current state to your hard disk. Given the speed of SSD drives, there's no need for sleep, as hibernate is now very fast. So, if you're still using sleep mode and you have an SSD, switch to hibernate instead.

It could also be argued that there's actually no need for either sleep or hibernate with an SSD, as systems can boot up much faster from cold anyway with an SSD. This being the case, if your PC boots rapidly from an off state, consider disabling sleep *and* hibernate.

A quick way to turn off hibernation is to use the command prompt. Open up an admin prompt and type 'powercfg -h off' and press Return.

### Configure SATA Ports To Use AHCI In The BIOS

This particular tip is one that many SSD users swear by and for good reason. Ensuring your computer uses AHCI SATA (Advanced Host Controller Interface) for your SSD drives can lead to a much improved performance of the unit and is often much better than using IDE SATA. So, make sure you check this, and change it if needed.

The drawback here is that this is a tweak that really needs to be done before you install Windows on the drive and therefore could be a problem of you're already running your OS. While it's easily usually found in the BIOS, the specific steps to enable AHCI will vary from motherboard to motherboard, so consult your documentation. You kept the motherboard documentation, didn't you?

If you don't want to reinstall Windows, there is a way around it and – again – it involves the Registry. Open it up and navigate to HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\Services\Msahci. Change the value of 'Start' in the right-hand pane to 0 and reboot. Before you load back into Windows, make sure you set up SATA AHCI in the BIOS.

### Create A Ramdisk And Move Caches To It

Using some special software, you can create a ramdisk, which is a way of utilising system memory as a drive, a very fast drive. You can get the software for free from [bit.ly/14LA9CU](http://bit.ly/14LA9CU) and, once installed, use it to create your ramdisk. You'll need at least 3GB of RAM to do this, and the free version of the program lets you create ramdisks of up to 4GB in size. A great use for your new ramdisk is to move various Windows' temporary folders and caches to it. This will provide lightning fast access to these often used files, and you'll notice a definite speed boost.

That just about ends our guide. Using that selection of tips, you should find you get even more performance out of your SSD, not to mention a longer lifespan for your money. Couple these up with general housekeeping and system maintenance, and you'll have a very fast and responsive system, which is always nice. [mm](#)



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# Code With AI2

## Sensor Animation

### Build an Android motion sensor animation app with David Briddock

In the last issue we used the Canvas component to build a touch animation app. This time we'll stay with the animation theme and the canvas component, but use the Android device's built-in motion sensors to control our sprite.

Remember, all you need to play along is a Windows/Mac/Linux PC, web browser and Google account. This time, though, you'll also need an Android smartphone or tablet to test the app.

#### What We'll Learn

This week we'll build a basic 'Hit the Sprite' game to further explore the Canvas component and, in particular, the collision detection element.

Also, instead of using touch interaction we'll look to move the sprite around the screen with the orientation sensor, which captures the angle of the device's screen many times a second and generates data accordingly. So then, let's get started.

#### Starting AI2

In your browser navigate to the AI2 home page ([ai2.appinventor.mit.edu](http://ai2.appinventor.mit.edu)) and sign in with your Google account.

We need a new project so, in the Projects menu, select the 'Start new project' option and give it a meaningful name, such as 'MMSensorAnimation'.

#### Screen Properties

We're automatically taken to the Designer View where there's already a component called Screen1. We'll drag and drop the other components onto this screen.

To the right is the Properties panel for the currently selected Screen1 component.

“ Instead of using touch interaction we'll look to move the sprite around the screen with the orientation sensor ”

In this panel ensure the AppName is 'MMSensorAnimation' then set the Title to 'MM Sensor Animation'. To help playability let's set the ScreenOrientation to 'Landscape'. Now we'll add some screen components.

#### The Canvas

In the Palette panel open the 'Drawing and Animation' group, grab a Canvas component and drop it onto Screen1 in the Viewer panel.

With the Canvas1 component selected in the Properties panel set both the Height and Width to the 'Fill parent...' option. Notice that Canvas1 now covers the whole of Screen1.

#### Adding Sprites

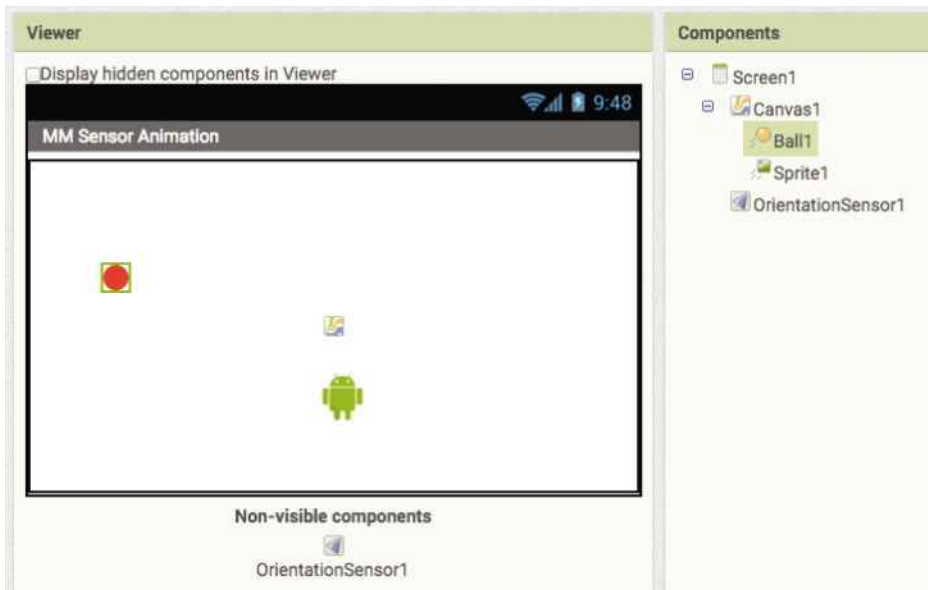
For this game we need two sprites. One will be the pre-defined Ball component while the other is an ImageSprite, just like we used last time. First, then, grab a Ball component from the Drawing and Animation group and drop it onto the Canvas1 area. With Ball1 selected in

the Components panel set the PaintColor to red and the Radius to 10.

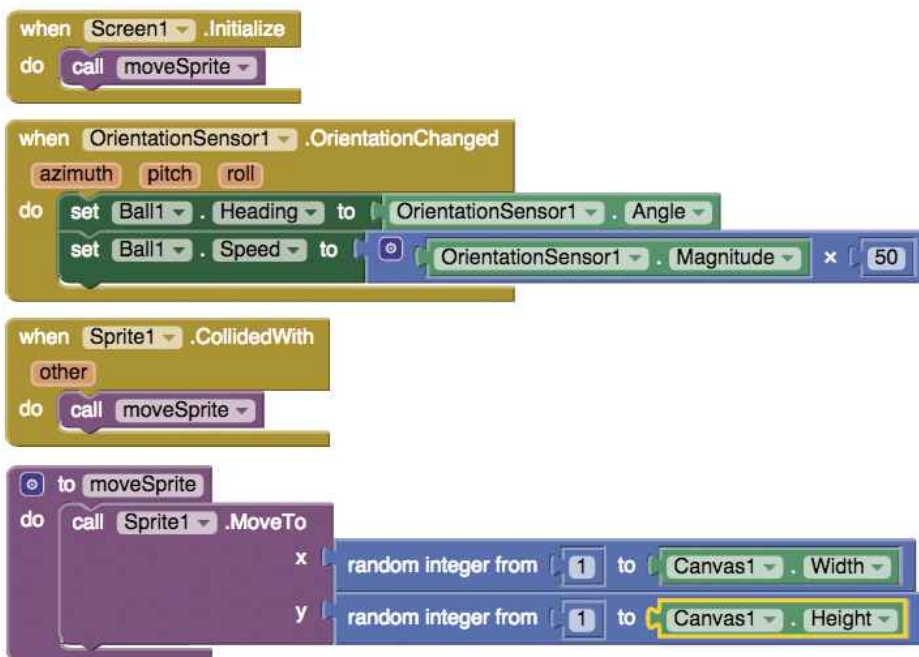
Now for the sprite. Once again we'll need an icon-sized image file. It could be the same image we used for the Touch Animation app or a new image. Grab an ImageSprite component from the same Drawing and Animation group and drop it onto the Canvas1 area.

With ImageSprite1 selected rename it to 'Sprite1'. To set the image click on the Picture property and select the 'Upload File...' button. Use the 'Choose File' button to find your PC file and then click 'OK'. The sprite image in the Viewer panel should change.





▲ AI2 designer view



▲ AI2 blocks view

## Sensor Addition

To capture Android device motion we'll also need an OrientationSensor from the Sensors group. Grab one and drop it onto the Canvas1 area. Notice it appear just below the screen in the non-visible components list, as well as in the Components panel.

## Coding A Procedure

It's time to start coding, so click on the Blocks View button located on the green bar. Our gameplay is simple, namely hit the sprite image with the red ball. We want the sprite image target to appear at a random

position on the canvas when the app starts and after each collision event.

As this behaviour happens more than once we'll put the behaviour inside a procedure. Drag and drop a purple 'to procedure' block from the Procedures group into the coding area. Then change its name from 'procedure' to 'moveSprite'.

Next grab a purple 'call Sprite1.MoveTo' block and drop it inside the procedure block. Notice this block has two empty values, namely 'x' and 'y'.

To set the x value grab a 'random integer from' block from the Math group. The first hole is filled with a blue Math number set to one, the second with a

light green 'get Canvas1.Width' block. Do the same for 'y' except this time we need a one plus a 'get Canvas1.Height' block.

Now we can grab a brown 'when Screen1.Initialize' block from the Screen1 component and drop it onto the coding area. Inside we simply call the 'moveSprite' procedure with a purple 'call moveSprite' block from the Procedures group.

## Motion

Ball direction and speed is related to the device tilt angle, as captured by the orientation sensor. From the OrientationSensor1 component grab a brown 'when OrientationSensor1.OrientationChanged' block and drop it onto the coding area.

From the Ball1 component grab a green 'set Ball1.Heading to' block and snap it into position inside the brown block. Now go back to the OrientationSensor1, grab a light green 'OrientationSensor1.Angle' block and snap it onto the end of the green block.

Next grab a green 'set Ball1.Speed to' block from the Ball1 component. Snap it into position right underneath the previous green block. To define a decent ball speed we'll need a little mathematical fudge factor.

From the Math group grab a cyan multiplication block (with an 'x' sign in the middle). There are two empty values to fill. The first value is set by a light green 'OrientationSensor1.Magnitude' block. The second is just a Math number block with the value set to '50'.

## Collision Events

We also need to handle collisions between the ball and sprite. From the Sprite1 component grab a brown 'when Sprite1.CollidedWith' block and drop it onto the coding area. Inside we just call the 'moveSprite' procedure we created earlier. So grab a purple 'call moveSprite' block from the Procedures group and snap it into place.

That's the coding done. Ensure the warning and error counts in the bottom left corner are both zero then carefully check your code against the Blocks View image. Test with the AI Companion App installed on an Android device (as we discussed earlier in the series).

## Going Further

There's loads of potential here. For example replacing the ball with an image sprite, increasing the ball speed over time, adding more sprite targets, devising a scoring mechanism and so on. Just have fun.

Next time we'll build a speech-enabled memo app. **mm**

# Remembering... Computer & Video Games

David Hayward recalls another classic games magazine of the 80s and beyond

Going against the distinctly partisan grain of 80s technology magazines, *Computer & Video Games* was the first multi-format gaming publication. It first appeared as far back as November 1981, a time when there were very few home computer gaming magazines. It remained on newsagent shelves until 2004, when its owner turned its full attention to the web-based incarnation.

C&VG stood out from the beginning; it originally cost 75p (around £2.90 today, apparently) and provided around 100 pages of reviews, features, ads and all manner of tips, tricks and cheats. This all came enclosed within elaborate covers, adorned with a large logo. More impressively, it was one of the first magazines to publish pages upon pages of BASIC listings for homebrew games, sent in by readers, for a variety of different home computers – and who can forget the Golden Joystick Awards?

The first issue claimed that the magazine was there to help push the boundaries of the reader's imagination, much like the programmers who were coding the latest games for the limited machines of the time. It looked at home computers, the actual machines, early consoles, as well the arcade machines you could find at your local seedy arcade or in the pub.

You could get paid as much as £10 for submitting a review, with more on offer if the game happened to be one of the more popular titles. Yes, I did send in some copy, but sadly it didn't make the cut. I was only eight at the time and a tad inexperienced when it came to writing.

## Its History

C&VG was launched by EMAP, with Terry Pratt at the helm as editor and stayed under its ownership for nigh on 20 years. Then, in February 2001, Dennis Publishing (*Micro Mart's* owners) bought it. At that time, C&VG was selling around 45,000 copies and had just launched a website.

A few years later Future Publishing acquired the title and attempted to mould the the magazine to better accommodate the new generation of consoles and gaming. However, in October 2004, the print side of *Computer & Video Games* was finally laid to rest and the focus was shifted to the internet side of things. This proved a healthy place for Britain's longest running games magazine and, as such, the traffic was enough to keep the name, if not the magazine, going.

Unfortunately, early 2014 saw Future undergoing a restructure, which earmarked C&VG for closure. Thus, on 26th February 2015, the C&VG site was closed.

## Did You Know?

- Melissa Ravenflame never actually existed, despite the rivalry between 'her' and the other 'Girlie Tipster', Hannah Smith, from *Crash*.
- Julian Rignall and a few other notable names worked for C&VG in the past.
- The Golden Joystick Awards first appeared in 1982/3, with winners including *Manic Miner*, *The Hobbit*, *Ah Diddums* and *Jet Pac*.
- In the first issue, you could win a cocktail *Space Invaders* cabinet!

## The Good

It covered a range of hardware and even arcade technology. Program listings, in BASIC and even in Assembly later on.

## The Bad

It often felt a little lacking in concentrated content. That's the nature of trying to deal with covering multiple, very distinct formats, we imagine.

## Conclusion

It's sad to see a magazine close, and C&VG's closure was particularly heart-wrenching.



▲ The first issue front cover, they don't make 'em like that anymore



▲ Melissa Ravenflame, the 'Girlie Tipster' of the 80s incarnation of C&VG



▲ Always one for controversy, this issue had an eye-popping digital Lara Croft centrefold



# Component Watch

Looking for a mouse for your gaming sessions? How about one of these?

Choosing a gaming mouse can be a relatively costly expense, so it's important to choose the right one. From number of buttons to weight to optical resolution, there are a hundred different things to make sure you've picked correctly, so don't let price become something extra to worry about. We've found the best deals around for these five models of gaming mouse so you don't have to worry about doing so!

**Deal 1: Asus Republic Of Gamers GX950**  
**RRP: £54.99 / Deal Price: £44.99**

Part of Asus's well-respected 'Republic of Gamers' line, the GX950 is a high-precision gaming mouse with six buttons, 8200dps sensor and five-way cable management. The selling point is almost certainly the weight system, which allows you to pick and choose the weight of your mouse based on what you find most comfortable. Perfect for gamers of any ability and perfectly in keeping with Asus's existing gaming credentials.

**Where to get it:** Novatech – [bit.ly/1jbSeAA](http://bit.ly/1jbSeAA)



**Deal 2: Gamdias Zeus Professional**  
**RRP: £69.99 / Deal Price: £42.10**

Unlike most mice, the Zeus Professional has three independently adjustable side expansion panels so you can customise the device for your hand size and grip. The laser sensor offers accuracy up to 8200dps, and a 2m cable length means there's always plenty of room to manoeuvre. Although expensive at RRP, discounts make this a solid-priced gaming mouse, and that means it's definitely worth looking at even if you consider yourself a casual gamer.

**Where to get it:** Dabs – [bit.ly/1L1nT1h](http://bit.ly/1L1nT1h)



**Deal 3: Mionix Avior 7000**  
**RRP: £79.99 / Deal Price: £53.99**

This high-end mouse has nine fully programmable buttons, three-step in-game DPS adjustment, user-assigned LED colours and a 2m long braided cable, so you know it means business (or rather gaming). Ambidextrous design means you can use it whether you're left or right-handed, and you can store up to five profiles for quick recalibration. There's also a two-year manufacturer warranty to keep your investment safe.

**Where to get it:** 365games – [bit.ly/1LnKuCd](http://bit.ly/1LnKuCd)



**Deal 4: Logitech G700s Wireless Gaming Mouse**  
**RRP: £79.99 / Deal Price: £69.99**

The Logitech G700s is a rechargeable wireless gaming mouse with a sensor that can be adjusted to anywhere between 200dps and 8200dps. There are 13 controls, which can be altered using the built-in Logitech Gaming Software, and its microswitches are good for up to 20 million clicks, so even heavy gamers won't wear it out! Combine all that with a fierce look and solid grippable surface, and this is one mouse we don't think you'll regret buying.

**Where to get it:** Ebuyer – [bit.ly/1L1nEmQ](http://bit.ly/1L1nEmQ)



**Deal 5: Razer Naga Epic Chroma**  
**RRP: £119.99 / Deal Price: £89.86**

Probably the most expensive mouse on the market, the Razer Naga Epic Chroma is a wireless mouse with a 8400dps laser sensor and 35MB of on-board storage for storing game profiles and software. Its built-in chroma light system means you can tweak its LEDs to any of 16.8 million colours. At full price you might justifiably expect miracles. But this deal makes it almost worth buying.

**Where to get it:** Pixmania – [bit.ly/1hs9fFE](http://bit.ly/1hs9fFE)





# Amazon Refuses To Sell Rivals' Releases

Apple TV and Google Chromecast removed

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# LG And Google Unleash Nexus 5X

## Marshmallow on board

**L**G and Google have teamed up again and the big reveal of their latest effort has taken place: step forward the Nexus 5X. It's a device notable for many things, not least the inclusion of Android 6.0 Marshmallow, the latest mobile OS from team Google.

As for the build itself, we have here a 5.2", 423ppi full HD display with advanced In-Cell Touch technology – faster recognition, better outdoor visibility and crisper images, according to LG. It's powered by a 1.8GHz Qualcomm Snapdragon 808 processor and its Type-C USB port means a ten-minute

charge delivers four hours of battery life. It provides users with a 12.3MP rear camera and a 5MP front-facing one, and we're told the sensors absorb more light than any previous Nexus device to create brighter photos with great detail.

As for security, the Nexus 5X comes with Nexus Imprint, a fingerprint sensor for unlocking the phone and using Android Pay (at least if you're in the States, for the moment).

Is it an iPhone-beater? Who knows? That phone is so popular, very little seems to make a serious dent on Apple and Samsung's hold on the market these days – but it certainly sounds promising.





**W**ell, it's one way of competing we suppose; apparently, Amazon is going to stop selling the Apple TV and Google Chromecast from October 29th, as it only want to sell products that "interact well" with Prime Video.

That's the official explanation at least, but it smacks of putting up the shutters in order to shove its rivals to one side. Amazon isn't obligated to sell its competitor products, of course, but then the flip of the argument is that it could be cutting off its

nose to spite its face when its competitor retailers will all be selling Apple and Google products alongside Amazon's Fire TV. By reducing the choice, Amazon runs the risk of upsetting its customers who may just decide to shop elsewhere. A possible win for the high street, then?

Amazon is certainly keen on rolling out its Prime services onto anyone who will pay, so whether this is the right tactic remains to be seen. It could be argued that it comes across as sour grapes, or as betraying a lack of faith in its own products.



Looking at this week's group test, I'm reminded of how lucky we are as modern PC enthusiasts. The boring, beige boxes of the past have been truly consigned to the rubbish tip of time, and we've reached a point where even the cheapest of PC cases look fairly decent.

Of course, if you want to spend more, you can still get all kinds of luxury cases, but you don't need to break the bank just to get something that looks okay.

Obviously, what really matters is what you put inside your chassis, but looks aren't the only reason to spend more on your case. Anyone who's ever owned a premium case will know this already, but if you've only ever gone for cheap units, upgrading to a better one will be a revelation. No more sharp edges ready to cut your fingers open, multiple tool-free drive bays, external fan controls and more. It really does make a difference.

Until next time,

*Anthony*

Editor

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# Website Package Evolves

## Web creation package from Incomedia

**I**ncomedia has announced the launch of the latest version of its WebSite X5 software package. Now at version 12, WebSite X5 promises responsive website creation results that automatically adjust to all device resolutions and websites that are also easy to put together thanks to the package's step-by-step approach to creation.

The package comes in three flavours: Evolution, Professional and Home. The Evolution version (£50) is billed as the perfect tool for creating websites, online stores and blogs in five easy steps with results that are responsive, compatible with all main browsers and optimised for search engines. As this is a less technical version of the product, users can concentrate on the design, choosing from over 1,000 customisable templates or create one of their own.

Going to the other end of the range, Professional 12 (£139) throws in more advanced e-commerce features and compatibility with the

FeedReady app for iOS and Android users, linking to the RSS feeds on created websites.

Trial it first at [www.websitex5.com](http://www.websitex5.com).



# Meanwhile... On The Internet...

**R**eddit has had a turbulent year, during which staff changes exacerbated its already fractious relationship with its volunteer moderators, which in turn led to outright revolt ([tinyurl.com/MMnet84a](http://tinyurl.com/MMnet84a)) and eventually the departure of its CEO, Ellen Pao. In the wake of this, its founders had to patch up a long-running rift in their relationship in order to try to steady the ship and set it on the right course.

In order to do this, it appears that and its new/old custodians have undertaken a fair amount of soul searching to determine exactly how the site is going to operate going forward. They probably did this thinking while they swept up the ashes of their dreams that Reddit could be a bastion of free speech and a community policed throwback to principles of the early internet – all of which had burned to the ground in the firestorm created by Gamergate, the iCloud photo leak and increasing critique of some of the sites darker corners ([tinyurl.com/MMnet84b](http://tinyurl.com/MMnet84b)). It's imperative for the survival of the site that changes were made, though, and that it begin to return some of the significant investments that have been made in it, based on its now 200 million unique users every month ([tinyurl.com/MMnet84c](http://tinyurl.com/MMnet84c)).

There have been signs of the work that's going on behind the scenes recently in the wake of Steve Huffman's return; some of the more distasteful areas are now harder to frequent ([tinyurl.com/MMnet84d](http://tinyurl.com/MMnet84d)), and last week saw the launch of Upvoted ([upvoted.com](http://upvoted.com)), a site that seeks to do what everyone else has been doing for a couple of years now: plunder Reddit for interesting viral stories. Basically, if Reddit is the front page of the internet, then Upvoted is a *What The Papers Say*-type digest of the best bits; it's all here from AMA highlights, ([tinyurl.com/MMnet84e](http://tinyurl.com/MMnet84e)) to Photoshop battles, Ask Science oddities to ELI5 insights. The only thing missing, ironically, is the commenting and upvoting that drives subreddit posts to the site's front page in the first place ([tinyurl.com/MMnet84f](http://tinyurl.com/MMnet84f)). Interestingly, though, it appears that the algorithm that handles that is also in for repair at the moment, so we may see even more changes soon ([tinyurl.com/MMnet84g](http://tinyurl.com/MMnet84g)).

**S**eemingly since time immemorial, people have been talking about the idea of Facebook allowing people to react to posts with a 'Dislike' rather than the ever-present 'Like'. It's never happened, though; the problems were obvious, not least the potential for getting hit with a flood of 'Dislikes' to become a deterrent to people posting something in the first place. Last week, however, Facebook debuted the solution it's planning to roll out.

A video posted to Mark Zuckerberg's wall ([tinyurl.com/MMnet84h](http://tinyurl.com/MMnet84h)) gave us the first non-leaked sight of the new

**W**hile 'hacktivist' group Anonymous's decentralised structure and loose affiliations means you can never really bring it down, authorities around the world have been hunting down those involved in its so-called operations ever since it rose to prominence in the noughties.

The latest to fall foul of US legal eagles is Matthew Keys, a journalist found guilty of providing members of the group with login credentials that ultimately allowed them to deface the front page of the *Wall Street Journal's* website in late 2010. He now faces a jail sentence (potentially 25 years, but likely less than five), despite maintaining that he has been convicted on a case of mistaken identity and was targeted by police for refusing to comply with requests to search his computer ([tinyurl.com/MMnet84r](http://tinyurl.com/MMnet84r)). He intends to appeal.

style 'reactions' that are being trialed with some Facebook users in Ireland and Spain. While 'Dislike' is notable for its absence ([tinyurl.com/MMnet84i](http://tinyurl.com/MMnet84i)), the new emoji-styled icons will allow users to 'Like' and 'Love' a post; say 'Haha', 'Wow' and 'Yay'; or express that they're 'Angry' or 'Sad'. It's a set of reactions that, according to comments on *The Verge* made by Facebook's Adam Mosseri ([tinyurl.com/MMnet84k](http://tinyurl.com/MMnet84k)), the firm was prompted to instigate by a constant stream of bug reports bemoaning the lack of alternatives to simply Liking something, and was inspired by analysis of one-word reactions and the use of stickers within the social network.

Exactly how we're meant to react if we dislike the new feature is currently unclear.

**I**t's interesting to note the recent affair surrounding the cancelling of conference seminar by security consultant Gianni Gnasa. He intended to outline vulnerabilities in surveillance cameras, in the face of legal threats from a manufacturer ([tinyurl.com/MMnet84m](http://tinyurl.com/MMnet84m)), which has, once again, led to debate over ethical hacking ([tinyurl.com/MMnet84n](http://tinyurl.com/MMnet84n)) and whether manufacturer attempts to limit the work of white hat hackers are increasing the potential of exploits for their hardware going unnoticed.

As more and more things become internet connected, we hear more and more stories like those recently engulfing VW and Jeep/Chevrolet. And when we know people like Stefan Rigo are out there ([tinyurl.com/MMnet84o](http://tinyurl.com/MMnet84o)), we'd reckon the dudes and dudettes out there hacking things to expose flaws are pretty much the least of our problems – and inspire more trust than some companies do. Hey, that's just us, though... What do we know?

## .AVWhy? Videos For Your Eyes... Not Necessarily For Your Brain

While many predict that eventually electronic devices will kill off the traditional paper book, there are many people who assert the superiority of the latter. Science, ironically, seems to agree with them ([tinyurl.com/MMnet84p](http://tinyurl.com/MMnet84p)). Whatever you believe, it's hard not to feel the excitement of reading a good book when you see the animated work of unPOP, which spent a month creating a paper representation of Hogwarts to show how reading can inspire a young mind ([tinyurl.com/MMnet84q](http://tinyurl.com/MMnet84q)). The only thing to really debate is whether you think *Harry Potter* counts as a good book, we suppose.





## Caption Competition



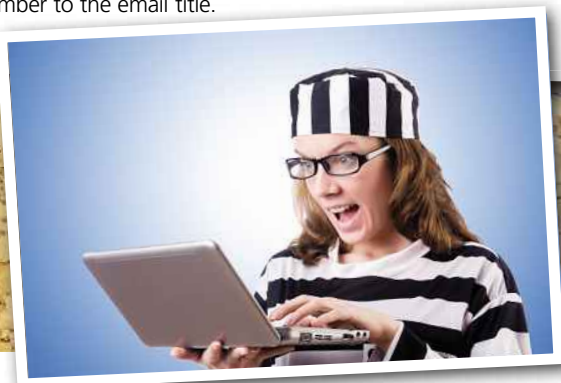
"I want a graphics card with CUDA technology, not scuba!"

This zany guy was the subject of issue 1382's kurazy kaption competition. Here's the best of bunch...

- **JayCeeDee:** "Just in case I fall off when I'm surfing!"
- **JayCeeDee:** "Can't get the hang of this 'sub-net mask' thing."
- **ricedg:** "You said I'd be thrown in at the deep end."
- **doctoryorkie:** "I went phishing, and all I got was this kipper tie."
- **The VFM Addict:** "Immediately after parking his Volkswagen, John dashed indoors to use his laptop."
- **Think Tank:** "Going phishing."
- **Thomas Turnbull:** "Can't wait to test the waterproof coating on my laptop."
- **Cliff Baker:** "A young man prepares to dive into coding."
- **Brian Gough:** "Things really are going swimmingly with my new laptop."
- **Robert Wheelhouse:** "This is not what I meant by water cooling!"
- **Leigh Spriggs:** "I want a graphics card with CUDA technology, not scuba!"
- 

This week's winner, though, was Leigh Spriggs with "I want a graphics card with CUDA technology, not scuba!", which is pretty clever if you ask us. Well done!

Of course, if you don't agree, there's only one thing to do, really: prove you're funnier. So why not head over to the 'Other Stuff' section of our forum ([forum.micromart.co.uk](http://forum.micromart.co.uk)) and by caption the picture below – or email us your funnies via [caption@micromart.co.uk](mailto:caption@micromart.co.uk), remembering to ad the issue number to the email title.



# Skype Introduces Translation Tools

## Now integrated into desktop version

Microsoft has announced that it's to bring translation functionality directly into the desktop version of Skype.

Skype Translator is already available as a separate application, but now Microsoft wants to bring the feature straight into the desktop app, meaning translation features will also be available on laptops and tablets running Windows

7, 8 and 10. Skype Translator handles 50 messaging languages and six voice languages and the update is coming within a few weeks so you'll see a Translator icon in the main chat window when the update's happened.



# NVidia's Game Streaming Service Out Of Beta

## Grid becomes GeForce Now

NVidia's game streaming service is now up and running, and it's got a new name. What was formerly known as NVidia Grid has become GeForce Now, and offers up to 1080p, 60 FPS streaming (the first cloud-based service to do so) of a catalogue of over 50 games currently on the books.

The service is open to NVidia's SHIELD family of gaming devices and it's going

to cost £7.49 a month, which isn't half-bad really. In terms of the aforementioned catalogue, you can play titles from the LEGO collection and the Batman *Arkham* series, using voice search to find what you're after.

If you do happen to own a SHIELD device, this is surely worth looking at. Bear in mind, however, that you're going to want an Internet connection of at least 30Mb/s as you'll be dropped down to a 720p resolution at 30FPS if not.

## Snippets!

### Arkham PC Fix Near

It's been a long old wait but *Batman: Arkham Knight* will be in digital stores for PC users by the end of the month. Hoorah and hooza, you may say but it doesn't quite make up for the fact that PC gamers have had to wait a full four months for Warner Bros. to get its act together following the angry reception to the game's woeful initial outing on Steam.

It said in a statement on Steam that, while a major patch was released a few weeks ago, the team wanted to fully iron things out before making the title available for purchase again.

### Jailed Over Laser Firing

A man in California has been sentenced to a year and nine months behind bars for firing a laser at a local sheriff's helicopter. Barry Bowser – real name, we promise – is the latest person in the States to be charged on laser-related cases such as this one and his two-day trial eventually led to the conviction. Bowser fired his laser from a property as a test, according to him, and he stupidly aimed it at the helicopter which was supporting officers on the ground at the time. As it temporarily blinded the pilot, this was a potentially dangerous affair.

### Facial Tech For Paying?

Payment processing firm Worldpay has said that it's developing a chip-and-pin terminal that also takes into account facial recognition technology. It's at prototype-stage at this point and the idea is that it will snap the customer's face to verify ID on transactions in an attempt to tackle identity fraud. As we say, it is only a prototype at this stage so there is nothing to get too worried or excited about here just yet, although if the idea of having your photo stored on a central database bothers you then this is hardly something to jump up and down over.

# Google Breathes New Life Into Old Hi-fi

**Dongle costs just £30**

**T**he world and its dog is now gripped in wireless audio heaven with digital music services and streaming devices having taken over from the good old-fashioned hi-fi of yesteryear.

Google hasn't forgotten about the past though and it's announced the Chromecast Audio dongle, a £30 device that will allow users to stream audio via amps and speakers over

wi-fi. Connectable via a standard 3.5m audio jack, optical or RCA cables, the dongle then streams audio from Spotify and other apps (including TuneIn Radio, for example) from Android and iOS devices or from a Chrome browser.

This is potentially a bit of a headache for the swathe of wireless speakers that have become ever-present on people's wishlists as this cheap-as-chips option takes

the financial pain out of going down that route. The streaming quality will depend on your connection of course, and it won't have support for streaming audio across multiple speakers at the same time – not yet, anyway, although that's likely to come some time next year.

Game-changer? Possibly. At the very least it's certainly a significant development in the audio space.

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## Couple Get Engaged... Over VR Headset

### Valve proposal goes rather well

**W**e don't typically cover affairs of the heart at *Micro Mart* but we'll make an exception this time round as this is news of a proposal with a technological element.

An employee over at Valve Software, the official SteamVR partner of the HTC Vive VR headset, decided to go where absolutely no-one had gone before – proposing to his girlfriend within a virtual reality space. The big event happened in a Vive testing room at Valve's US headquarters where she had gone under the assumption that she was going to be testing some SteamVR demos.

She wrote on her Facebook feed: "So there I was, typical day... on a sunken ship deck; fixing robots; painting three-dimensional fire; walking through the Alps. Suddenly, a virtual engagement ring started floating my way."

Smooth. Although, when you consider that the actual proposal took place with her boyfriend holding a trackable wand controller while she wore a huge Vive headset and it all rather makes you hark back to simpler times when people gazed longingly into each other's eyes to ask if they would marry them. Anyway, she said yes so that's all good.

In other VR headset news...



# Oculus Rift Won't Be Cheap

**More than \$350, reports say...**

**T**he Oculus Rift headset is going to cost over \$350, according to quotes attributed to company founder Palmer Luckey. If correct, that correlates with the upper end of estimates predicting what the headset would cost at retail.

Apparently, Luckey gave the game away during the Oculus Connect conference, when he responded to a question asking whether the price would be in line with its \$350 developer kits and

he duly responded "We're roughly in that ballpark." Reportedly, the firm isn't especially bothered about a lower price point as it doesn't want to compromise on quality in its custom hardware.



# Vodafone Boost Pub Signals

**No excuse when the other half calls now**

**A**s part of its new Rural Community Programme, Vodafone has begun a pilot that will see four village pubs in Norfolk and Wales benefit from an enhanced 3G signal.

The improvements will be provided by using 'femtocell' signal boosting stations, with each location getting a dedicated box to facilitate this. Vodafone has used the pubs because it says they are the "nerve centre of the village". Of course, it

also makes for a good story, giving Vodafone's chief technology officer Jorge Fernandes the chance to say such pun-tastic phrases as "we want to call time on no mobile coverage, not have time called on the pub and village life". Urgh.



# Video Clip Case Thrown Out Of Court

**Lawsuit against ESPN dismissed by judge**

**A**merican sports are a very different beast to the pastimes we enjoy here in the UK. We wouldn't say that they were worth sleeping through, though. When US sports broadcaster ESPN spotted a New York Yankees fan snoozing during a game last July, the commentator had a field day making fun of him.

Then the clip went viral, amassing well over 1.5m views on YouTube, and the dozing chap decided enough was enough. He

opened up a \$10m lawsuit against the broadcaster on the grounds of defamation of character as he claimed that the airing and distribution of the YouTube clip had caused him a great degree of mental anguish. Last month, though, the judge threw the case right out of court stating that no action could be taken against ESPN for the comments.

Public shaming is never a good thing, and we actually feel rather sorry for the chap involved in this, however unintentional any distress may have been.

## XFx R7 370 2gb Double Dissipation Black Edition

XFx releases another 300 series card that uses much older technology

### DETAILS

- Price: £119.99 (Ebuyer)
- Manufacturer: XFX
- Website: [xfxforce.com](http://xfxforce.com)
- Requirements: PCIe 3.0 x16 slot, PCIe six-pin power line, Windows XP or later



After covering the XFX R7 260 Core Edition, I was hoping that the next rung up on the GPU ladder would contain something more exciting.

The XFX R7 370 2gb Double Dissipation Black Edition is XFX's pre-overclocked offering, and costs about £30 more than the R7 360. For that extra dosh you not only get a bigger dual fan cooler, but also the GPU core has more shaders, TMUs, ROPs, and critically a 256-bit memory bus with bags more bandwidth.

And being the Black Edition, this one has also been factory tweaked with an extra 75MHz on the GPU clock, now 1040MHz, and 50MHz on the baseline GDDR5 clock, giving the quad pumped equivalent of 5800MHz.

Therefore, for just another £30 you get almost a 50% bump in GPU power over the R7 360, making this a better value option.

Most of this extra grunt comes from the extra memory bandwidth rather than the clock speeds or shaders, and this translates well for those wishing to run games at resolutions above 1080p or multiple panels using Eyefinity mode.

The card supports four displays from the available outputs, though the lack of HDMI 2.0

does mean you'll only get 4K at 60Hz through DisplayPort.

However, there are a few more important skeletons in this closet that I'm duty-bound to pull out and parade, in much the fashion as I've done with R7 360 series cards.

Like that card, or specifically all R7 360 cards, this one is built on a rebadged GPU – one that went by the name Pitcairn Pro, before it was the Curaçao Pro, and is-now calling itself Trinidad Pro, but has an identically sized

die with the same number of transistors fabricated at the identical 28nm scale process.

That GPU's origins are the OEM Radeon HD 7850 that appeared in 2012, when it supported DX 11.2. These days, it's sold as DX12 compliant, but that's DX12 (11\_1) and not DX12 (12\_1) as delivered by AMD cards that support GCN 1.1 and 1.2.

Being only GCN 1.0, it also doesn't support TrueAudio, though it supports the Mantle and Vulkan APIs, should you be interested in those.

I'm mentioning this because I think it's important that you understand what you're buying isn't the cutting edge of AMD video technology. However, I'll also point out that this is still decent video technology that's fine for general gaming.

What the benchmarking reveals are numbers that are very much in line to what I would have expected from an R7 270 last year, and ironically 3DMark

### Benchmark Performance On 3DMark

		XFx R7 370 Black Edition	XFx R7 360 Core Edition	VTX3D R9 285
Cost		£119.99	£88.03	£129.99
3DMark Fire Strike	Performance	5521	3759	7329
	Extreme	2664	1774	3626
Sky Diver		17993	13854	22193
Cloud Gate		23207	18878	25459
Ice Storm	Extreme	136166	125379	138885
	Normal	146736	144651	146869

Tests performed Asus Sabertooth X79, Core i7-3960X CPU, 16GB DDR3 quad-channel memory, Crucial MX100 SSD, running Windows 10 Build 10547.





kept on identifying this one as its predecessor when I ran its tests.

What's also important to realise is that pre-overclocked cards also have less headroom for user tweaking, as this technology is going about as fast as it's ever likely to in this configuration.

On a more positive note, the power demands of this layout allows it to operate with only a single PCIe six-pin power line, because everything above this from AMD needs two or at least a single eight-pin. Being able to

swap video card without having to consider a PSU upgrade is always a good thing. This specification should work with a 500W PSU, covering the majority of PCs built for gaming.

The big issue for the XFX R7 370 Black Edition isn't the cheaper cards below it, but the large number of more powerful ones sat in the channel just above its cost.

There's a dearth of R9 285 cards that can be found for a tenner more, which my

TechPowerUp GPU-Z 0.8.5

Graphics Card		Sensors	Validation
Name	AMD Radeon (TM) R7 370 Series		Lookup
GPU	Pitcairn	Revision	N/A
Technology	28 nm	Die Size	212 mm <sup>2</sup>
Release Date	Jun 18, 2015	Transistors	2800M
BIOS Version	015.049.000.002.000000		UEFI
Device ID	1002 - 6811	Subvendor	XFx Pine Group (1682)
ROPs/TMUs	32 / 64	Bus Interface	PCI-E 3.0x16 @ x16 1.1
Shaders	1024 Unified	DirectX Support	11.2 / SM5.0
Pixel Fillrate	33.3 GPixel/s	Texture Fillrate	66.6 GTexel/s
Memory Type	GDDR5 (Samsung)	Bus Width	256 Bit
Memory Size	2048 MB	Bandwidth	185.6 GB/s
Driver Version	15.200.1062.1004 WHQL / Win10 64		
GPU Clock	1040 MHz	Memory	1450 MHz
Default Clock	1040 MHz	Memory	1450 MHz
AMD CrossFire	Disabled		
Computing	<input checked="" type="checkbox"/> OpenCL	<input type="checkbox"/> CUDA	<input type="checkbox"/> PhysX
	<input checked="" type="checkbox"/> DirectCompute 5.0		

AMD Radeon (TM) R7 370 Series Close

benchmarks demonstrate are another 40% quicker than the plucky R7 370 series. And confusingly, they're also fully GCN 1.2 compliant, even though they launched over a year ago.

The bottom line on this card is that if you wanted to buy an R7 270 last year but didn't, then you needn't worry that they're disappearing from the shelves.

What concerns me is that there appears to be an expanding hole in the AMD range between cards like this one and the Fury series, which is being filled by older R9 stock.

However this is fixed, I just hope for AMD and XFX's sake that this GPU and memory

combination doesn't return next year as the R7 470.

**mm Mark Pickavance**

*A nice card but ultimately rehashed GPU technology*



# Dell Inspiron 17 5000 Series

Mark enjoys the full resolution potential of Dell's new 5000 series laptop

## DETAILS

- Price: Starting from £379. Reviewed: £649
- Manufacturer: Dell
- Website: [www.dell.com/uk](http://www.dell.com/uk)
- Model No. Inspiron 17-5758

Everyone has a laptop size they're most comfortable with that depends on if they need to carry it places and what exactly they do with theirs.

However, the choices have been rather clouded in recent years by small 13" or 14" systems that had very high-resolution displays. You end up scaling the interface to make the system usable, essentially sacrificing the resolution for usability.

The alternative, as envisaged by Dell, is the Inspiron 17 5000 series. For a machine that isn't very expensive or dusted with Ultrabook magic dust, I'll say from the outset this is a pleasing computer to use.

The texturing of the silver plastic outer shell gives you

confidence that you won't drop it, and when you open it up, there's a lovely rubberised finished surrounding the amply sized keyboard and trackpad.

Mounting a 17" panel, there's plenty of room in opposing parts of the system, and Dell has generally used it well. Therefore, there are no silly ports along the rear edge luring you to break them and damage their associated cables. And the side placement of ports makes them easily accessible, as well as being logical for what sort of things you're likely to plug into them.

The review model was a high-end 5758 spec 5000 series, and it comes with a Core i7 CPU, Nvidia GPU, plenty of RAM and a 1TB drive.

But the standout feature here is the 17.3" LED backlit display, where you can use the native 1080p resolution without resorting to scaling or a magnifying glass.

At this price, it isn't touch, and the TN technology used doesn't have great viewing angles, but it's crisp, bright and the colours are well saturated.

The model above this one does have touch for those that like want to use that feature with Windows 10, and for those looking to save money, the cheaper versions have a 1600 x 900 panel instead.

Unless you're looking for extended battery life or have a very limited budget, this is the spec you want, where you get a combination of a powerful CPU and high-resolution screen.

The computing power in here is substantial. Featuring a fifth-generation Core i7-5500U (4M cache, up to 3GHz) and 8GB of DDR3L RAM, things run along nicely. However, a mildly



## Specifications

**CPU:** Intel Core i7-5500U (4M cache, up to 3GHz).  
**RAM:** 8GB (1x 8192MB) DDR3L, 1600MHz.  
**GPU:** NVIDIA GeForce 920M (4GB DDR3).  
**HDD/SSD:** 1TB HDD (5400 rpm).  
**Display:** 17.3" full HD (1920x1080) resolution TN panel, glossy.  
**Optical Drive:** DVD optical drive.  
**Connectivity:** Wi-fi 802.11ac, Bluetooth 4.0.  
**USB:** 2x USB 2.0, 1x USB 3.0.  
**Ports:** HDMI, 10/100 Ethernet, SD, SDHC, SDXC card reader, 3.5mm combo headphone/microphone audio jack.  
**Battery:** 40Whr, four-cell lithium-Ion.  
**Thickness:** 27mm.  
**Weight:** 2.83kg





confusing choice is the inclusion of a low-end Nvidia GPU to sit alongside the one that Intel included inside the Core i7.

This addition suggests that there might be game potential here, though the GeForce 920M isn't remotely that sort of GPU. Benchmarks reveal that it's only marginally quicker than the built-in Intel HD 5500 and uses more watts to achieve that speed advantage.

There may be some multimedia power efficiency to be gained here, but as a gaming platform, don't expect to be using 1080p resolution

with details settings above their lowest level.

Where this machine shines more brightly is in respect of general work duties and also as a media system. Using PCMark08 Home 3.0 test, the system scored 3016, a solid result, and it also managed to last over 3.5 hours using the same test to completely drain the battery.

In less challenging use, you should get more than five hours out of a charge and more than four hours of video playback. For any system with a Core i7 CPU that's impressive mileage.

I've only one real gripe about this machine, and that's lack of upgradability. Dell very kindly provided a massive access panel on the base that allows access to some of the internals. Using this, you can get to the 1TB hard drive and the SoDIMM memory slots easily. However, I was expecting to at least see a M.2 SATA port, allowing a neat SSD upgrade to boost this machine's performance, but there isn't one. Yes, you could just swap out the internal drive for an SSD, but a dual drive is what users really want.

That point aside, this is a very likable system that delivers exactly what many want in clean and uncluttered design. I'm not sure what the GeForce 920M adds, but almost everything else in here

contributes to a very positive user experience.

Dell is getting much better at these types of system, and Asus, Acer and Toshiba should certainly take note. **mm Mark Pickavance**

**Big screen, big processor and decent battery life**



# Armello

Kevin Pocock rolls his die and turns up a spirited find

## DETAILS

- Price: £14.99
- Website: [www.armello.com](http://www.armello.com)
- Developer: League of Geeks
- Requirements: Dual-core 2GHz CPU, 2GB RAM, DirectX 10, 4GB free disk space, Windows 7 or later, a Steam account

**A**rmello first gained attention thanks to a successful and enthusiastic Kickstarter campaign in April last year. By that point, League of Geeks had already been working on the title for some three years. This makes two things obvious: first, the game is hardly big budget, and second it's a bit of a labour of love. Indeed, League of Geeks has opted for smooth execution and the subtle capturing of imaginations, typical of a growing favourite rather than an instant hit. With a good community reception, success is still yet to be proven, but the game's intriguing position is winning players over.

*Armello* is a role-playing, tabletop, multiplayer title. These don't come around often, and it's been likened to a *Game of Thrones* plot in its 'race to rule' mentality. Yet it's a race carried out by four animals more akin to the IP's 'banner sigils' than George RR Martin's characters. Single player, skirmish or a yet-to-be activated 'ranked' games are the options, and your aim is to triumph or else lose. In the land of Armello, the king, a lion, is mad and suffering from Rot. Rot corrupts and reduces his health daily, and you have nine days (two turns a day) to dethrone him.

Wolf, rabbit, bear and rat (male or female) are the



▲ Just some of the tricks you can play on opponents

characters scouring a honeycombed, isometric field to claim victory. Mountains, swamps, dungeons, stone circles, forests, grass lands and settlements make up the playing field kingdom. Each can help or hinder your route to victory, and this can be achieved through prestige (deeds), the collection of 'spirit stones' or gaining Rot.

Individual games are procedurally generated, so the map may mean a personal handicap at the start (swamps injure, mountains cost two action points). Players begin in their 'clan lands' and have three action points per turn. Each turn, you draw cards from Item, Spell and Trick decks. The number of draws depends on the number of cards in-hand and your character's own 'wit score'. More wit means more cards, but cards require gold or magic to play.

Aside from wit, gold and magic, you'll also need to keep an eye on your body, feel, prestige, spirit and Rot stats. These, of course, are influenced by clan and character traits, items, cards and game events. Don't be fooled; you'll be scrutinising yours and the stats of other players ever more closely as games draw on.

The interplay of these statistics makes for a beguiling and tactical

affair, enough to keep drawing you back in an attempt to master every machination. It's tricky, though: if you have one Rot point each day, you'll lose one health point each day. You can remove Rot with a spell card, but if you've little magic, then you may be stuck looking for stone circles tiles, which offer small health boosts. In *Armello*, you can rather quickly find yourself roaming the map, ailing and poor or striding around, with spells and magic aplenty, gold, prestige and battle items the envy of all. Things change quickly, though.

The King's own guard roam the map, and bounties can change the game dynamic dramatically, as can 'banes', beast of the Rot, which spawn when summoned either willingly or by accident. Kill a bane and you gain prestige. Kill a guard, even in self-defence, and your prestige will suffer. If you die by any means, your prestige takes a hit. Therefore, a leading player who takes their eyes off the board might be defeated by plotting enemies, be poisoned, and in trying to regain contention, become magic-less and gold-less. Alliances can be made just as easily as they are broken, and trust is worthless.

You'd be right to think all of this leads to an intriguing but

increasingly frantic attempt to get ahead of your opponents. Do you prioritise prestige and entry to the palace through deeds? Do you collect four spirit stones to banish the king? Or do you prioritise gold, equipping items and engaging in dice-driven battles with other characters? Some players employ stealth, cunning and avoidance, but whatever you choose, it's valid if it works.

Ultimately, *Armello* is enjoyable and addictive enough to gain well-earned support. After all, it has 6,213 Kickstarter backers who helped raise \$305,360 Australian dollars at a median cost of \$49 each. That's no small feat and indicates clear faith. In return, League of Geeks has produced a tactical and tricky title – one that should also be praised for striking art and animation, delightfully atmospheric music and accessibility. *Armello* is tricky and infuriating. True since launch, the latter is more due to technical problems and disconnections (thankfully acknowledged, and a shrinking issue), but it's fun and equally rewarding for all ages. Additional items unlock through allegiance to a clan and repeat plays are enjoyable.

At £13, *Armello* is a solid buy, and upcoming developments mean it can only get better.

**mm Kevin Pocock**

**A Kickstarter king-maker and a fun one at that**





# Pinnacle Studio 19 Ultimate

A trio of new/upgraded video editing solutions from Pinnacle



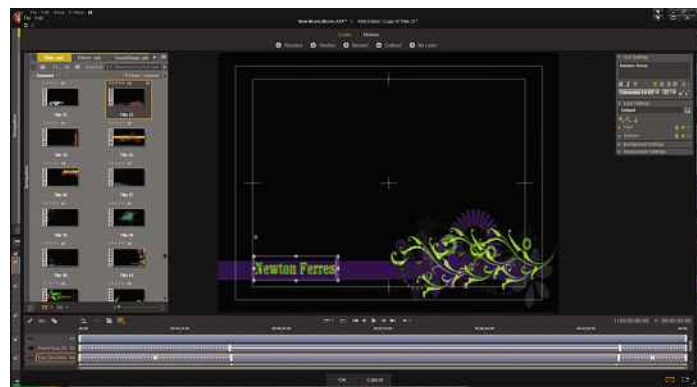
## DETAILS

- Price: £ 99.95
- Manufacturer: Pinnacle
- Website: [www.pinnaclesys.com](http://www.pinnaclesys.com)
- Requirements: Dual-core 1.8GHz CPU, Windows 7 or later, 4GB RAM, 8GB disk space

If you've ever dabbled in video editing, you'll certainly have heard of Pinnacle's Video Studio, which is now in its 19th edition. Recently updated, the program is available in three versions, Studio, Studio Plus and Studio Ultimate. This review covers the Ultimate edition, which is the most expensive but, as you might expect, has the most features and comes with bags more content. In fact, it has more content than any other editor I've ever seen. To give you some idea, you have over 1,500 transitions to choose from. These include the usual wipes, fades and dissolves, yet includes things like rotating, collapsing boxes and two clips changing place while rotating around a planet (I kid you not!). Then there's an equally comprehensive range of video effects which, like the transitions, can be previewed by clicking on them. Finally, you get a huge collection of audio clips, covering every sound effect you could wish for, together with a brilliant selection of background music. This is also more than it seems, because each audio track can be changed almost infinitely in the ScoreFitter. As the name implies, it's a utility to subtly alter the base track in terms of its tempo and genre. You can also stretch the audio file to fit



▲ A very simple drag and drop interface



▲ The title editor is comprehensive

your production, and in a few seconds scorefitter will render it automatically for you. This really is a massive collection, but like all digital effects they should be used with some restraint.

This latest version of PVS is nothing like the last one I looked at. The new interface is typical of modern video editors, with a timeline along the bottom of the screen, below a project bin and preview monitor. Clicking the tabs along the top of the project bin reveals the transitions, effects, titles and other content. (Incidentally these are not fixed tabs; you can add or remove them to suit your current project.)

To assemble your video, you simply drag and drop the files onto the timeline, adding titles, transitions, effects and audio in

the same way. Once in position, you can edit them in terms of length and content. In the case of titles, there's a more comprehensive editor to change everything from the font to the text style and colour – even the way the letters will animate on the screen.

After completing your projects, you'll naturally want to save them in a suitable format; here again there's a wide range to choose from. The MyDVD Disk Menu includes a selection of menu templates covering DVD, Blu-ray and AVCHD, with output formats up to 4K. It also provides a range of format types to suit the final playback device.

Finally, for those who's are already familiar with PVS, what's new in this version? Well, my last paragraph was a bit of a

clue, because the program can now handle 4K video files. Naturally, you'll need a system that can cope with the increased file sizes, but I guess if you're into video editing, that's a given anyway. In my opinion, one of the most important additions is the move to 64-bit architecture; the performance increase on display is outstanding. Other additions include multi-camera editing, so you can edit footage from two different cameras while keeping the clips aligned and audio synced. On top of that, you can multi-layer using up to six audio and video tracks.

Pinnacle obviously thought all the content I mentioned earlier wasn't enough, so it's added a 30-day, all-access pass to StudioBacklot.tv, featuring brand-new Pinnacle Studio 19 content and loads of Video Studio training. Incidentally, this isn't the usual mediocre giveaway stuff you get with some products; we're talking top-quality training and files that are well worth having.

That's not a deal we'd easily turn down. **mm Joe Lavery**

*Simple to use and fantastic value for money*

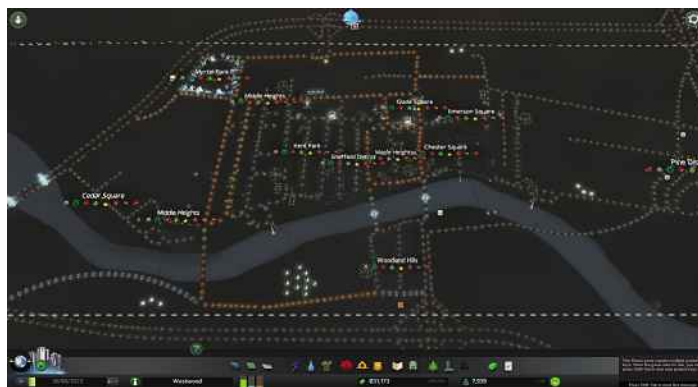


# Cities: Skylines - After Dark

How does a city look after dark? Okay, I guess...

## DETAILS

- Price: £9.85
- Developer: Colossal Order
- Website: [www.citiesskylines.com](http://www.citiesskylines.com)
- Requirements: Intel Core i5 3470, 6GB RAM, 1GB disk space, Radeon HD 7870 or equivalent, Windows Vista or later



Further additions include a commercial zone 'tourism' specialisation, in which hotels and other attractions will spring up into the sky, towering above residential streets and the local drug store. And should your citizens or tourists need help getting to such places, a new taxi transport option can be called on to add more strife to your road-planning rudimentals.

What 'opens the box' a little here is the addition of an international airport as well as waterside leisure activities, like a good old fishing tour or marina. However, as with the other additions in *After Dark*, these fail to add an extra engaging dynamic to change the way you go about things. This is the real shame. Yes, the game mechanic does lead you towards the happy balance that is successfully nurturing a growing city, but the lack of drama or change offers little extra to get excited about.

Having said that, *Cities: Skylines* has a healthy community, plenty of mods and charm enough to lure you back for one final tweak of your bus routes. And in adding to that, I suppose *After Dark* succeeds, if not in any fantastic fashion.

**mm Kevin Pocock**

**A solid update, if lacking excitement**

**A**fter *Dark* is the first official add-on to Colossal Order's city sim, a game which leap-frogged the troubled *Sim City*. *Cities: Skylines* brought a solid and enjoyable experience to all those who delight in order, productivity and happy citizens. So what does *After Dark* add to it?

The main giveaway is in the name. 'Day and night cycles' are the headline feature – or rather night cycles that mix up the permanent daylight. Anyhow, the inverted commas are there because the cycle isn't exactly daily. In *Cities: Skylines*, days go by in a blink, so rather than change the mechanic, we've been given around a month of night and then of day.

Ignoring this quirk of the in-game star system (and your citizens daily lives), the change from day to night brings with it an attractive aesthetic. Street lamps, commercial buildings, bridges and wind farms illuminate as residents go to sleep. Residential areas quieten as life moves elsewhere.

Other things change at night too – the rate of crime for one, although if you have a pretty safe city then you likely won't notice this a bit. Certain 'leisure' facilities see an upturn in trade (the

new nightclubs and bowling alleys, for example), although disappointingly this doesn't seem to strain your city's police force either. Fights, property theft/destruction and some social unrest are definitely not to be encouraged, of course. Yet it's certainly something I'd expect to see more of after dark. But no, once your city is safe, it's pretty much safe.

Colossal Order has missed a trick here, and that's a shame.

Safe too with the night cycle is your mains power grid – that is, unless you load a saved game that incorporates nothing but solar power. That'll need adjusting, or you can watch your city plunge into darkness during the month of dark every cycle of the moon. Oops!





# Samsung SmartCam HD

Michael continues to monitor home activity when he's out and about

## DETAILS

- Price: £84.94 from Amazon.co.uk
- Manufacturer: Samsung Techwin
- Website: www.samsungtechwin.com
- Requirements: n.a.

Developed by Samsung Techwin, a part of the Samsung family, the SmartCam HD is a single wi-fi camera solution for delivering a 1080p live video stream of activity from a location within the home. Along with the camera unit, which can be free-standing or wall-mounted, this kit consists of a power lead with two- and three-pin adapter plugs, Ethernet cable, mounting screws and rawl plugs. You'll need to download a free app from the iOS App Store or Google Play for setting up and controlling the live feed from the camera with a smartphone.

The camera features a built-in microphone, speaker outlet and a micro-SD card slot, which provides storage for any captured content. While reasonably well made, the camera is rather lightweight, and I found it had a tendency to topple over in free-standing mode, until I placed a weight on the stand to alleviate this problem. This is a design issue that needs to be resolved.

Using the app, you'll need to create a free account in order for the camera to function. This account will require the entry of a user ID, a password, plus your name and email address. Once the account has been registered, you'll be led through the setting up of a link between the Samsung device and a home network, either via the supplied Ethernet



“ The SmartCam HD has a tendency to topple over in free-standing mode ”

cable or wi-fi. In the case of the wi-fi link, my chosen route, the process took approximately three minutes, with an on-screen clock providing a countdown.

With a link established, you can give the camera an appropriate name, such as its location, and add a protective password. The SmartCam app gives you the option of adjusting various settings categorised as General, Network, Time, Event and SD Card. Depending on the particular category, you can adjust the volume levels for the speaker outlet and microphone, turn on the night vision feature, switch to another LAN, select from different time zones, adjust the motion and audio

detection sensitivity, plus create a link to a Google account in order to receive email alerts of possible activity.

When viewing the live streaming feed from the camera on a smartphone, you have the option of landscape or portrait orientation. Personally, I preferred landscape orientation rather than the letterbox view offered with portrait mode. Video clips and still images can be captured and stored on an SD card. A two-way talk feature can be used to communicate with whoever is in the vicinity of the camera, while soothing music can be played if the camera is being used as a baby monitor. Other options allow you to adjust brightness and opt for the

highest video setting of 1080p if your smartphone can handle such quality.

All in all, the Samsung Techwin SmartCam HD unit is easy to set up and delivers reasonable video quality, without necessarily matching the definition delivered by some competing products. However, you do get a wide range of features that provide a greater functionality, which could be the deciding factor for some.

**mm Michael Fereday**

*Plenty of features but requires stability assistance*



# GROUP TEST

## PC Cases

The humble PC case has come a long way since those beige boxes of the past. These days, you'd be hard pressed to find one that doesn't look futuristic and utterly amazing. David Hayward takes six different cases and sees which have what it takes to make it to your desktop, with the best combination of style and functionality.

## PC Cases

# Aerocool Dead Silence Red Edition Cube Case

### DETAILS

- Price: £53
- Manufacturer: Aerocool
- Website: [goo.gl/hGHNWg](http://goo.gl/hGHNWg)
- Requirements: micro-ATX motherboard, PSU

This micro-ATX case has many alluring features, not just for discerning PC cooling enthusiasts, but also for those who fancy having their hardware fitted into a case with a little more style than usual. For starters, it comes in a range of colours: blue, green, black, white and red (the model we have for review here). The finish features extraordinary leather-coated front and top panels, with smooth matte-black sides or an optional acrylic window. The leather exterior offers a far more pleasant look to the case, with the black-and-red theme pairing especially well, while keeping it generally scratch-proof and adding, in some small way, to the noise filtering.

The front comes equipped with a single 5.25" drive bay with a single 3.5" bay beneath, both of which have the leathery fascia

and can easily be popped out of the case mounts with the clips on either side. To either side of the leather front panel there are a pair of indented sections that provide ventilation access to the large 200mm/500rpm fan attached to the interior front of the case, drawing the air through and over the internal components to be dealt with by the rear, internally mounted 120mm exhaust fan.

The top of the case has a lot going on. There's a large central panel that can be removed in favour of an included meshed cover for greater airflow, which underneath would sit a set of optional fans. The central panel is easily removed with a sliding latch, and a new panel can be popped into place in a matter of seconds, should you ever need to. Along the edges of the top central panel are the power, reset, headphone and mic ports, and on the opposite side are four USB ports, two USB 2.0 and two USB 3.0. It's worth noting as well that the indented ventilation section also runs along the top of the case, as it does on the front panel.

Everything inside the case is rubberised to reduce vibrations and noise levels, and the

motherboard lies horizontally across a raised section for maximum airflow when fitted and to allow 190mm of CPU cooler clearance and full-sized graphics card. The PSU is fitted at the very bottom of the case, with the exhaust fan aiming down through an included dust filter and out through the raised and curved bottom of the chassis.

The drive bays are tool-less with rubber mounts, and leading cables can be passed through a series of slots designed to keep everything tidy and to improve the internal airflow. The slots are really well machined, with rounded edges to protect both the cables and your fingers. Finally, the rear houses a pair of rubber-encased holes for an optional water cooling setup, below which is a shielded, single PCI bracket that will keep everything in its place.

The Aerocool Dead Silence Red Edition Cube is a neat, stylish and very functional case.



▲ The rather magnificent looking Aerocool Dead Silence Cube, with its leathery red exterior



▲ The interior is spacious and well-managed too



## Corsair Obsidian 250D

### DETAILS

- Price: £70
- Manufacturer: Corsair
- Website: [goo.gl/uawBUP](http://goo.gl/uawBUP)
- Requirements: mini-ITX motherboard, full sized ATX PSU capable

This is Corsair's first leap into the mini-ITX case market and one that spent its fair share of time in the limelight at CES 2014 amid the fawning attentions of technology journalists the world over. It's certainly unique, though it divides opinion on whether it's visually appealing or downright ugly. Beauty is in the eye of the beholder, though, and despite looking a bit like a small fridge, there are some decent design incentives to this case.

It measures 290 x 277 x 351mm and weighs 4.42kg, which makes it a little too big to be completely classed as mini-ITX (but still well within the realms of a living room PC).

It's a fairly striking design, mind you, one that you'll not forget in a hurry. The black, anodised brushed-metal finish, together with top-fitted window, side-fitted grilles and the design of the sides, which sweep down to form the large feet, is quite appealing.

The front panel is kept extremely simple, with just a pair of USB 3.0 ports, joined by the pair of HD audio ports on the right-hand side of the optical drive and the power and reset buttons inhabiting the opposite side, the upper-left corner. This makes the case feel more minimal, and due to the brushed-metal finish continuing over the buttons and port mounts, there's a good sense of style.



▲ Not a mini-fridge, but rather the Corsair Obsidian 250D



▲ Considering its size, there's plenty of room inside

This is designed as a mini-ITX case for gaming, though, and with that in mind you'll find enough room inside for a single 5.25" optical drive, two 2.5" drives and two 3.5/2.5" drive combos. The case includes a front-mounted large

140mm fan, with a further 120mm side-mounted fan and allocated space for an additional rear-mounted 80mm fan. There's also space set aside for radiator mount locations, both on the front and the side, and the H55,

H60 and H100i Corsair liquid coolers are fully supported. A full-sized PSU and full-sized graphics card can be fitted with relative ease, and the interior is arranged so that the front mounted 140mm fan will draw cool air over your graphics card with more than enough clearance for larger CPU cooling solutions.

Opening the case is easy enough and requires a minimum of fuss. One feature we did like is the fact that the entire case can be dismantled down to the barebones structure for easy access. This means you can better manage component and cable placing than with most other ITX cases.

In essence, all this means you can have a relatively powerful PC or instead opt for an ultra-mini gaming system, without sacrificing the overall style of the PC. In other words, you could comfortably have this as a living room media and gaming PC without it actually looking too much like a media or gaming PC.

The only downside we found was the noise. While it wasn't too overbearing, the fans did kick out a fair amount of noise when the case was placed nearer than was ideal. It's still an impressive, if odd-looking, mini-ITX case, though.



## PC Cases

# BitFenix Prodigy

### DETAILS

- Price: £60
- Manufacturer: BitFenix
- Website: [goo.gl/McIlnb](http://goo.gl/McIlnb)
- Requirements: mini-ITX motherboard, PSU

**B**itFenix produces a wealth of cases for all form factors that incorporate both style and functionality. The Prodigy range, (Prodigy M for ATX and Prodigy for mini-ITX) are particularly eye-catching and very reminiscent of Apple case designs. In this instance, we had the mini-ITX Prodigy case for review, available in a range of colours, from black and white through orange, red, blue and green, all of which look good.

The case itself is a little bigger than a standard ITX cube, because BitFenix added two sets of flexible, but very sturdy, feet and handles. Both sets are made from a composite technology that BitFenix refers to as FyberFlex, and they absorb shock, reduce vibration and allow you to carry the case around. They're very flexible and allow you to push and pull the case around with some degree of force without fear of breaking anything. However, they do make the case wobble slightly, and if you place it on a desk, you'll soon begin to notice movement when you're wildly hammering away on the keyboard.

The designs do differ slightly dependent on your colour choice: the black Prodigy is actually a mesh-fronted case, which increases the airflow significantly by providing a large area through which it can expel or intake air. Other



▲ Although it does wobble a bit, the BitFenix Prodigy is a splendid ITX case

colours, however, use plastic covers that restrict the airflow. The coloured plastic cases look better, for our money, but if your main concern is ventilation, then the black version may be preferable.

The Prodigy's dimensions are 250 x 404 x 359mm,

120mm fans in the top of the case as well.

The internal structure is very well organised and designed, with plenty of room to accommodate the various components beyond the motherboard. This means there's also enough



▲ There's a surprising amount of room inside

cooling and a front pair of USB 3.0 and HD audio ports.

We really liked the BitFenix Prodigy, especially since the review version was a decidedly impressive Ferrari red. The exterior design of the case looks fantastic, the interior design is extremely well constructed, and the overall feeling is one of quality and engineered perfection. Okay, so it's a little bigger than most of the ITX cases available, and the FyberFlex feet make it wobble a bit if you touch the case, but these are only slight niggles that are easily overlooked when compared to the overall product, which is splendid.

“ The overall feeling is one of quality and engineered perfection ”

with it weighing a not too considerable 7kg. There's room inside for a single removable 5.25" optical drive, five 3.5" drives and nine 2.5" drives, although not all at the same time. The case comes with two large 120mm fans: one at the front with room for another and one at the rear of the case, which can be swapped out for an even larger 140mm fan should you wish. There's also enough room for a couple of

internal space for better cable management and airflow. And to add to the internal design, BitFenix provides a removable PSU cage for easy swapping out – provided you're using a modular PSU design, of course.

Added benefits of the BitFenix Prodigy also include the ability to fit full-sized expansion cards, just enough space for advanced cooling, plenty of motherboard clearance for high-end CPU





# NZXT Phantom 410

## DETAILS

- Price: £70
- Manufacturer: NZXT
- Website: [goo.gl/9LiQ9Z](http://goo.gl/9LiQ9Z)
- Requirements: ATX motherboard or smaller, PSU

If it's an eye-catching design with sleek lines and an impressive looking LED lit interior you're after in your PC case, then NZXT has the answer for you in the form of the Phantom 410. This is a mid-tower chassis that has all the stylings of a Stealth Fighter. It's lean, with angled sections across the front and over the top of the case – not quite centre, but slightly off and sweeping over a windowed section on the top, while moving to the opposite side toward the bottom where a mesh air intake sits.

The Phantom comes in a variety of colours: white, black, red, white with blue stripes (which we have for review here), black with orange stripes, gunmetal, and black with white stripes. It may seem like a crazy collection of hues, but they work extremely well and lend the case either a more futuristic look or that of an armoured vehicle.

It measures a satisfyingly large 215 x 516 x 532mm and weighs 9kg. Inside you'll find three 5.25" drive bays and six 3.5" drive bay slots, all of which are tool-less and set out in a rail design for easy access and removal.

Cooling is an important factor with the NZXT Phantom, since it seeks the allegiance of gamers. The included fans comprise of a front 120mm unit, rear 120mm and a single top 140mm fan. However, you



▲ The NZXT Phantom 410 is certainly one of more impressive looking cases available



▲ Internally, there's ample space for the most elaborate of builds

can optionally install a pair of 120mm fans at the front, another 120mm fan to the side, two 140mm fans along the top and finally another single 120mm fan on the bottom of the case. These can be swapped out for single 140mm fans if needed.

There are some pretty neat features in the Phantom. For

one, the right-hand panel houses easy access to the 3.5" drive bays, rubberised cable holes, loads of cable tie areas and a large cut-out section for the custom cooling solution. The rear of the chassis offers seven expansion slots, a couple of grommets for passing a water cooling solution through and

a section to the base where the PSU is fitted. Likewise, the underside of the case has a mesh dust cover over the PSU fan and further mesh sections for cooling and the aforementioned fan. What's more, the entire case sits on a set of rubber feet to cut out noise and vibration.

The only downside to this rather set of features is the fairly weak front door, which pops out and swings to the left to reveal the 5.25" drive bays. While it's okay, it does feel a little flimsy considering the level of quality throughout the rest of the case. However, in this day and age, how often do we access the optical drive?

There are plenty of sections along the inner rims of the case to fit an LED strip, and the windowed areas provide a good level of viewing for the light show some system builders insist on fitting. There's the potential here for a pretty spectacular looking case and, as we said, the quality of the NZXT Phantom 410 is astounding. It has been machined to near perfection, and regardless of the colour scheme, the case looks truly wonderful. Certainly one to consider come the next case upgrade.



## PC Cases

# Aerocool Strike-X Air

### DETAILS

- Price: £90
- Manufacturer: Aerocool
- Website: [goo.gl/8viiYf](http://goo.gl/8viiYf)
- Requirements: ATX motherboard or smaller, PSU

As you can surmise from the title, this is an open-frame PC case and one that we've used in the past when we need to group test a variety of motherboards, graphics cards and other internal components. It's quite a spectacular thing to behold, looking almost like it's about to transform into a robot, but it can look a little odd when sat on a desk and used primarily as a user's main PC. It's not that it's ugly; it's just not all that practical to someone who doesn't continually have their hands inside a PC. It measures 340 x 613 x 535mm, so it's certainly not the smallest or most compact case on offer here either. It does, however,

▲ *Its odd design won't appeal to everyone*

limit its weight to a manageable 6kg, since it's mostly just a steel frame and rubber mounts here and there.

It has three 5.25" drive bays and three 3.5" drive bay slots, which are cradle, hot-swap based. There's the usual front port selection, with a single USB 3.0 and three USB 2.0 ports, headphone ports, power and reset. The dominant feature at the front is a large, hinged

mesh lid, behind which a large 200mm fan resides. The mesh lid can flip up and allow you access to the horizontally mounted motherboard area. You can either extend a jack to hold the mesh section in place so it's directly above the motherboard or have it rested on the frame so as to be angled down toward the board and components.

The right-hand side of the Strike-X Air, where you'll mount the drives, can be completely removed and slides out of the frame to allow easier fitting. The cables can be run from the drive section down to the PSU area that's meshed at the base and out through the rear of the case to various machined slots and rubberised grommets, with access to the motherboard section for better cable management.

Obviously, drinks shouldn't be allowed within half a mile of this case, nor should your cat. Dust is a pain too and if left without regular cleaning or stuffed under a desk on a carpet, you'll get even more of a potential clogging issue than you normally would with a standard case.

If you're a tester or tinkerer, though, the benefits of the

Aerocool Strike-X make it worth the expense. The quality throughout is very good indeed, with the various parts and sections machined to a high standard, without a razor sharp edge in sight. Even the limited colour scheme (red mesh and red LED on the matte black of the steel frame) looks pretty good despite the impracticality of it being a full-time desktop case.

We like the Aerocool Strike-X Air, but then our job makes us the kind of people it's designed for. Since Micro Mart caters for PC enthusiasts, we'll hazard a guess that you too spend more time tinkering than using, in which case the Strike-X will suit your needs nicely.



▲ *The Aerocool Strike-X Air is certainly a unique PC case*





## BeQuiet Silent Base 800

### DETAILS

- Price: £90
- Manufacturer: BeQuiet
- Website: [goo.gl/W47AMt](http://goo.gl/W47AMt)
- Requirements: ATX motherboard or smaller, PSU

There's a fine balance between practicality, upgrade potential, cooling performance and noise reduction when it comes to choosing the right case. Most PC case manufacturers have a degree of each but often don't score too highly when it comes to the cooling and noise levels. BeQuiet, though, may have ticked all the right boxes.

The BeQuiet Silent Base 800 is an interestingly designed chassis. While it doesn't opt for the dazzling splendour of multiple LEDs and windowed side panels, it still looks pretty good. There's a minimalist quality to it, with a hint of colour, depending on the whether you opt for the silver trim model or the orange-and-black version (with a rusty orange trim around the front and sections of the interior). It's a design that works well and that's quite understated and elegant.

This ATX case measures 266 x 559 x 495 and weighs a hefty 9.4kg. Within, there are three 5.25" drive bays and seven 3.5" drive bay slots.

The included cooling solution comes in the form of two front-mounted 140mm Pure Wings 2 fans and a 120mm rear-mounted Pure Wings 2 fan. The Pure Wings 2 fans offer a maximum speed of 1500rpm, while only issuing around 18dB(A) in terms of



▲ The minimalist looks of the BeQuiet Silent Base hides some exceptional engineering



▲ Internally, it's an excellent build and whisper quiet

the noise levels. There's also room for a pair of 140mm top-mounted fans, a single 120mm side fan and a single 140mm bottom fan.

The build quality of the BeQuiet Silent Base 800 is excellent. The covers are manufactured from ABS

plastic, with steel side panels and plenty of rubberised pads throughout and along the raised and removable, pair of skids that make up the base stand. The top features a large power button, slightly indented in the centre, with two pairs of USB 3.0 and USB 2.0 ports,

alongside headphone and microphone jacks.

The rear of the case has seven expansion slots, three cooling grommets, plenty of mesh sections for the fan, a section for the PSU to fit at the bottom of the case and a slide-out dust filter under the PSU section.

Inside the case, the first thing you'll notice is the sound dampening material covering the entire inner section of the side panel, with a square area cut out for placing a fan. There are plenty of colour coded (depending on the chassis colours) rubber cable sections, along with similar coloured silicone 3.5" drive slot rails – again to cut down noise levels and vibration.

Throughout the interior there are foam pads where the PSU, drives and raised spacers for the motherboard are fitted. This cuts down noise levels considerably while raising the levels of the component parts slightly for somewhat better cooling, even if it is only a few millimetres.

The effect is superb, and it's exceptionally quiet, even with the side panel removed. BeQuiet has done a fantastic job with the Silent Base 800, and it's a case that we can wholeheartedly recommend.





### BeQuiet Silent Base 800

While it may not be the flashiest PC case in the group, the subtle looks and minimalist design of the BeQuiet Silent Base 800 make it one of the best manufactured cases we've seen for some time. What's more, it's perfectly silent and has plenty of scope for further component expansion in the future.



### NZXT Phantom 410

The NZXT Phantom 410 is an impressive PC case. The angled lines of the chassis, the windowed sections and the interior space all combine to make it for ideal for a gaming system or a showcase PC that will look great.

## How We Tested

We tested each case with an Asus H971-Plus motherboard, fitted with a stock cooler, stock RAM and an Nvidia GTX 750Ti and, where possible, a low-profile Asus GeForce GT210, generic DVD writer and a Kingston HyperX Fury 240GB SSD.

	BeQuiet Silent Base 800	Aerocool Strike-X Air	NZXT Phantom 410	BitFenix Prodigy	Corsair Obsidian 250D	Aerocool Dead Silence Red Cube
<b>Price</b>	£90	£90	£70	£60	£70	£53
<b>Form</b>	Mid-tower	Open frame ATX	Mid-tower	Mini-ITX	Mini-ITX	Cube micro-ATX
<b>Measurements</b>	266 x 559 x 495mm	340 x 613 x 535mm	215 x 516 x 532mm	250 x 404 x 359mm	290 x 277 x 351mm	265 x 411 x 381mm
<b>Weight</b>	9.4kg	6kg	9kg	7kg	4.42kg	8kg
<b>No 3.5" Drive Bay Slots</b>	7	3	6	5	2	3
<b>No 5.25" Drive Bays</b>	3	3	3	1	1	1



# Your Letters

## Small Linux Distros

I am a user of Linux Ubuntu. It runs on my main PC, which I built many years ago. I recently astonished the man at SCAN computers when I told him it was time for an upgrade and bought an Intel Pentium IV processor to extract what is, I believe, the maximum upgrade juice I can from this old machine, which is based on a ASRock P4VM8 motherboard. I sometimes wonder what that processor would have cost back when I originally put the machine together.

Anyway as someone who enjoys bumbling around with computer, and certainly is no expert (apart from when I built a Sinclair ZX80 from a £99 kit with a 1K memory), I managed to install a LAMP system on this PC and – by using the phpMyAdmin part – I have several databases, which are accessed from my browser by typing in 'local host'. No, please do not ask how I did it, but I did and it works fantastically. I love it far more than the Windows database (whatever it is called), which caused me endless problems.

Now here is the thing, I thought it would be good to replicate this system on an old IBM Thinkpad 600X and soon realised after a while that, apart from the restriction of a 700MB CD, the actual machine is low on memory (589MB) and so very few Linux Distros would load and run. So, I was thinking about how I could do it, when the good old *Micro Mart* cavalry came to the rescue with a brilliant feature, designed especially for me, on Small Linux Distros, which I am reading avidly.

I used to think that there was very little in the mag for Linux bumbles like myself who like to play around, but I do hope that some more features will appear. For example I sort-of understand repositories and how to use them, access them etc. but features on this line would be great if targeted at the likes of me who enjoy discovering new ways to extract the most from old machines and have only a little IT savvy. Keep up the good work.

**Alan Peddler**

## Believable Speeds Or Dirty Deeds?

My BT saga continues. I have just tried to download Catalyst Drivers via the much vaunted BT infinity. 285MB of data, not much you would say, but just to see how long it would take I watched the Catalyst timer. For the first 20 seconds or so the Mb/s thundered down my connection, but then it slowed and slowed until the magic figure of 174 minutes appeared that was to download less than 90MB of the data remaining. Is this a record for broadband .32MB per minute? Is that what BT means by infinity? At that speed it should take three years to download a terabyte of data.

My whole point is that internet broadband tests fail to analyse Upload and Download speeds over a period of time its no good analysing a few seconds

of speed it should be done over a much longer period of time. I checked my broadband speeds just after I cancelled my download and lo and behold my download speed was 17Mb/s. Are the I.S.P cheating the system by allowing a full speed download for 20 to 30 seconds or so and then slowing it down? It wouldn't surprise me one bit. If a reputable company like VW can manipulate tests for emissions what's to say the ISP don't do the same for downloads tests. A few lines of code to catch a request for a download test and you have a dubious speed record.

I have just checked again and its still 17Mb/s for the few seconds the test took according to U-switch.

**Dave Shaw**

## GET IN TOUCH...

### By email

[letters@micromart.co.uk](mailto:letters@micromart.co.uk)

### By post

Micro Mart  
30 Cleveland Street  
London  
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### Online

[forum.micromart.co.uk](http://forum.micromart.co.uk)

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## Mark Oakley presents his steamy guide to all things punk

**D**on't they look funny?" And so it came to pass that my parents-in-law encountered their first steampunk enthusiasts, leading to much embarrassment for my wife and I as they exclaimed the above remark all too loudly, directly in front of the well-dressed group.

Of course, one man's well-dressed is another's laughing stock – particularly given that this was mid-afternoon on a drizzly summer's day in the lovely coastal village of Corfe Castle. And while the location and time of day certainly helped the enthusiasts stand out from the crowd (as was no doubt the intention), it's still perhaps best not to lavish a group with such a damning, albeit unintentional, outburst.

The steampunkers moved on, and I was left having to answer a barrage of questions from my wife's parents regarding their newfound interest in this genre. A full half an hour later, and energised with all this knowledge, imagine their joy when they bumped into the group again on a train out of the village. When we next spoke to my father-in-law on returning from our holiday, he told us all about this second encounter and how he had apparently decided that it would be not at all inappropriate to ask of one of the group's members, "So, steampunk... how about that Victorian technology?" He didn't get a reply.

True story, readers, and one that leads me nicely into this exploration into the steampunk movement and its impact on computing, technology and gaming. And hey, if it can have an impact on my parents-in-law, it must be doing something right.

### Steampunk: Say What?

Steampunk, for want of a better description, is a genre of science fiction that celebrates both the Victorian era and the technology of the time. Typically set in an alternative, very British Victorian world (although the American version of steampunk relates to the American West), the idea behind the genre is that the use of steam power has continued to progress, so much so that weapons, transport and gadgetry have adopted it on a mainstream level.

Steampunk started out life as a literary phenomenon, and the term 'steampunk' was actually first coined by writer KW Jeter in a letter he wrote in 1987 to a science fiction-focused magazine called *Locus*. He was attempting to describe the genre of writing that he and others were becoming known for pioneering at the time, and he has since described himself as having "bumbled" across the term. He's actually pretty modest about the whole thing, but he is certainly viewed as one of the more important drivers of the genre.



While it's a relatively recent genre of writing, it's fair to say that steampunk's early influences can be traced as far back as the 19th century when writers such as Jules Verne and HG Wells were already writing about such fantastical notions as time machines and travels to the centre of the very earth itself. Certainly in terms of fashions, transportation and ideas, these classic writers laid the seeds for what we now know as steampunk, providing the inspiration for modern writers to create classic works of their own.

Inspired by the invention and use of steam-powered technology at the time and bringing that in line with a futuristic, fantastical storytelling, the Victorian era typically plays a crucial role, with many stories being set in that era. However, that's not a prerequisite, although being inspired by that era pretty much is. As for the technology itself, clockwork and cog-driven designs, brass and copper plating are all key elements of the steampunk look.

## “ Steampunk's early influences can be traced as far back as the 19th century ”

So gadgetry and technology that is far advanced from anything we know but ultimately has its roots in a bygone era are a staple of steampunk – clockwork contraptions, steam-powered flying machines, airships and a general, mechanised viewpoint on the world. The technology side of things is obviously why PC owners and gamers often have more than a passing interest in steampunk over other science fiction genres, although the gritty, retro look doesn't hurt to get people interested. It's a unique, engaging look that certainly stands out from the crowd.

It's also a look that you can recreate for yourself in your own PC setup. Indeed, many already have.

### Steam Mods

The PC modding community isn't one to pass up an opportunity to make some outlandish, over-the-top creations, and steampunk is a perfect place to start for that. Want lots of dials, cranks and cogs, all wrapped up with bells and whistles on? Thank goodness for the internet.

In America, Datamancer.com's blog ([www.datamancer.net](http://www.datamancer.net)) details some of Richard 'Doc' Nagy's keyboard creations, turning your common key-tapper into a work of art. Made to order, the custom-designed 'boards include a \$1,650 'Seafarer' keyboard, which looks as though it could have come straight out of the *Bioshock: Infinite* universe. Other boards include ones with mahogany frames with brass accents; the 'Sojourner' board, which is crafted in polished brass and was featured in an episode of the TV show *Warehouse 13*; plus the Copper 'Baron of Cyprus'



keyboard, which has a polished copper frame, black leather plate and green jewel indicators. The site can even supply keyboard kits consisting of aluminium or brass frames so customers can potentially build their own boards.

Beyond the keyboards-to-order, the blog also features a modded Asus gaming laptop running off an Intel i7 2670QM processor, complete with a stained glass lid that also lights up. Then there's what is described as "the device that started it all" - the Steampunk laptop. This Hewlett-Packard ZT1000 laptop runs both Windows XP and Ubuntu Linux and features an "elaborate display of clockworks under glass, engraved brass accents, claw feet, an antiqued copper keyboard and mouse, leather wrist pads, and customized wireless network card." Ingeniously, the machine turns on with an antique clock-winding key, and this has received plenty of press attention, featured by the likes of Wired.com, the Wall Street Journal and The Boston Globe. Now that, my friends, is a beautiful machine.





“ There’s no getting away from the fact that steampunk isn’t for everyone ”

While that effort may have been an early example, it’s certainly not the most successful. That honour perhaps rests with *Bioshock: Infinite*, a truly outstanding multi-platform first-person shooter that won a ton of awards and sold in bucket-loads upon its release in 2013. Drawing on the American version of steampunk, which takes its inspiration from the Wild West, *Bioshock: Infinite’s* fictional city-in-the-sky, Columbia, is very much the beating heart of the gaming experience, as is the weaponry at your disposal. Away from the steampunk sensibilities, this is just a riotously good romp in its own right and a high-profile success that helped to bring steampunk into the mainstream.

While I’m not a fan of the *Final Fantasy* series myself, the sixth instalment is a decidedly steampunk-styled affair, with the industrial 19th century the setting’s clear inspiration. There are robots and steam-powered machines aplenty in this critical and commercial success on the SNES. More recently, the point-and-click puzzler *Machinarium* (2009) was undeniably inspired by steampunk, and it’s a beautiful game to look at, either on PC or on an iPad. Another popular iPad game taking its cues from steampunk is the award-winning *80 Days*, which even bagged itself a smattering of BAFTA nominations this year and was named as TIME magazine’s 2014 Game of the Year.

And finally we come to the controversial *The Order: 1886*. The PS4 exclusive released earlier this year was much anticipated, as the console had yet to really launch an exclusive title that showcased its graphical capabilities. *The Order: 1886* was to be that game, but that didn’t stop gamers from complaining about its heavy-handed adoption of quick-time events and non-playable cut-scenes. With a swathe of underwhelming reviews

Steampunk Workshop ([steampunkworkshop.com](http://steampunkworkshop.com)) is another good place to start when looking for modding inspiration. The website is the brainchild of Jake von Slatt “a maker, tinkerer, fabricator, and all around techno dilettante living and creating just outside of Boston, Massachusetts”. His projects are not confined to computing mods, but the works he has done in that area are magnificent.

Take his keyboard mod, for example. With the aim to build a fully functional retro keyboard, usable by a touch typist, he started with an IBM Model M keyboard from the 1980s, manually cut out a brass cradle and various interior cutouts for the board, before then smoothing down with files. The keys were made of brass tubing, and then a healthy dose of black paint was added to complete the look. Reading his website, it’s obvious that this is no mug’s game, and you really need to know what you’re doing to achieve these kind of results – but, wow does Jake know what he’s doing.

The All-In-One PC project was completed in 2008, with Jake deciding that his pumpless water-cooled PC was obsolete. He bought himself a \$300 24” widescreen monitor and set about turning that into his all-in-one project. Stripping the monitor right down, Jake then made an aluminium plate to hold a motherboard and disk drives, and a brass plates were positioned either side of the monitor. A whole lot more sawing, trimming and soldering later, including some bronze brazing rods to be positioned on the sides of the build, the Kubuntu-based build was ready. And isn’t it a beauty?

These are but two of the possible steampunk modding sites to look at, and if you’re not impressed with their efforts, I don’t think steampunk is really for you.

## From Chaos Engine To The Order: Steampunk In Gaming

Given the glorious imagination and styling that underpins steampunk’s appeal, it’s little surprise that videogaming has a long and wonderful history of adopting the movement.

The first successful incarnation is probably the Bitmap Brothers’ *The Chaos Engine*. Released in 1993 for the Amiga, *The Chaos Engine* was a steampunk lover’s dream. Set in a Victorian-age England, the plot revolves around the adoption of future-style weaponry and technology having been transported back to the 1800s via a time machine, and it successfully taps into the genre with the styling and overall look of the game proving key to its enduring popularity.







hitting the press, graphically at least people were impressed, with the common consensus being that this representation of a steampunk Victorian era was the best that has ever been put into pixels. Clearly, developer Ready at Dawn (despite its reticence to label it as steampunk) had done its homework, and the world itself is exquisitely realised. The characters at times may be thinly drawn, but the weaponry – provided by the inventor Nikola Tesla – looks and plays wonderfully. Chapters set in a blimp are truly breathtaking to play and to watch, and while the game itself might not be for everyone, it is, for the time-being at least, steampunk's finest gaming hour.

### So, You Want To Buy Steampunk?

If a full-on PC mod doesn't float your boat just yet and you'd prefer to take a brief dip in the waters first, let me guide you in the direction of some items you might want to buy.

Firstly, for gathering more information on the steampunk movement and giving yourself the requisite knowledge to hold your own in a steampunk-off, you could do worse than pick up a good book or two. Anything with the title 'bible' in it is usually a good all-round place to start, and in this case, *The Steampunk Bible* by Jeff VanderMeer and SJ Chambers is particularly notable, as it's an illustrated guide to the subculture, looking back at its history and focusing on the styles, fashions and influences driving steampunk. It is also, as with all the best guides, a beautiful thing to hold.

Classic steampunk novels include the likes of *Infernal Devices* by KW Jeter, *The Difference Engine* by William Gibson and Bruce Sterling, and the anthology book *Steampunk*, edited by Jeff VanderMeer. Beyond those examples, you could do a lot worse than read HG Wells's *The Time Machine*. Sure, it came long before steampunk was established as a concept, but many of its themes and ideas could be considered as being at the root of modern-day steampunk.

If you prefer your influences on celluloid, you'd probably have to look at the critical failure that was *Wild Wild West*. In fact, this Will

Smith-fronted film was adapted from the 60s TV show *The Wild Wild West* and the Victorian-era scenery, gadgets and overall look of the film was a definite doffing of the cap to steampunk. The TV show, too, was one of the first mainstream examples of taking the genre out to the wider public. For a more enjoyable movie to watch, try *Steamboy*, a pretty excellent animation in which steam-powered technologies dominate.

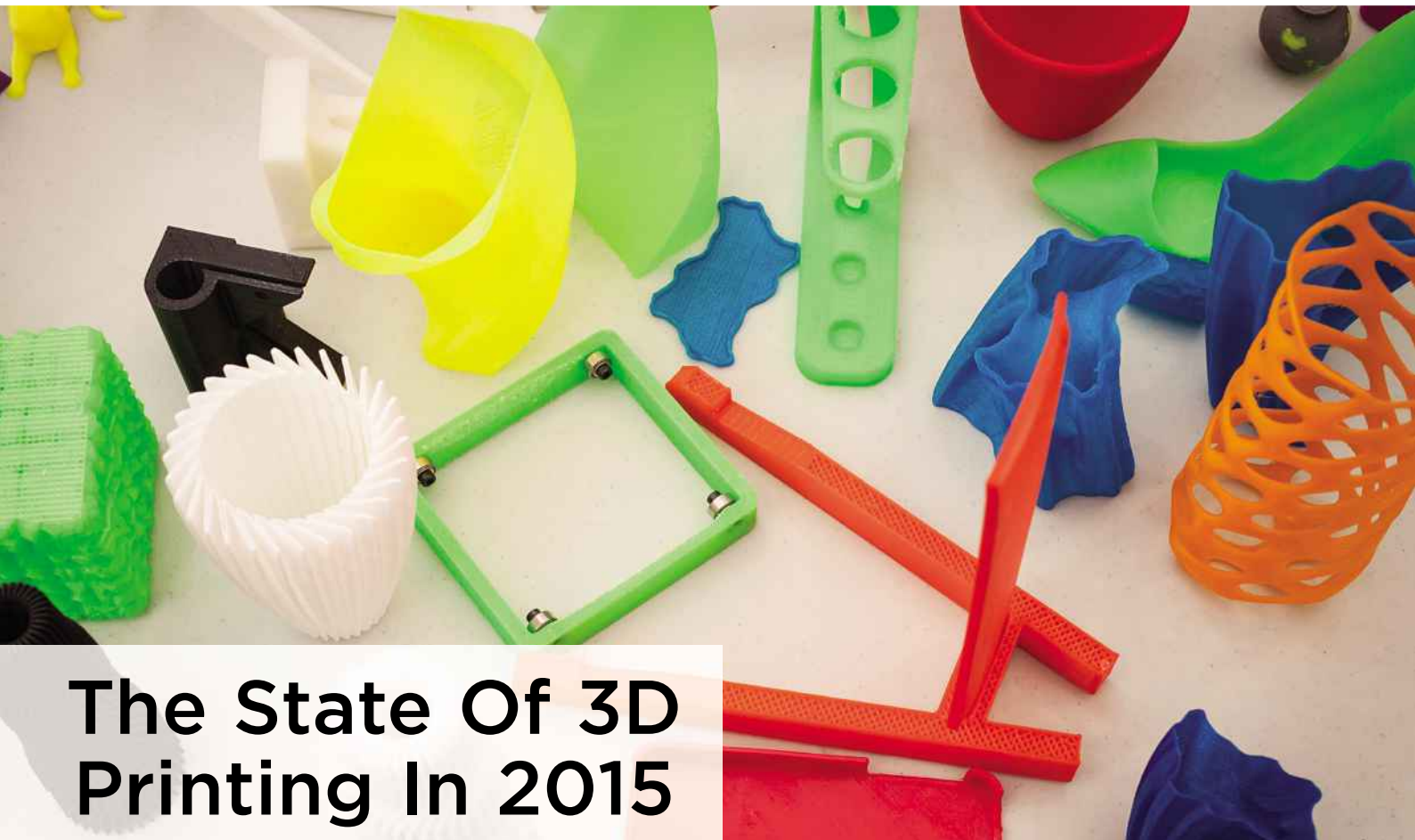
Gifts and costumes relating to the genre can all be found online (I don't need to tell you how to use your web browser to do this), and if you really find yourself becoming more immersed in the genre, why not take it up a level by heading to the Steampunk World's Fair ([2016.steampunkworldsfair.com](http://2016.steampunkworldsfair.com)). You'll be heading over to New Jersey if you do, where you'll be treated to a variety of entertainment, workshops and panels, as well as seeing merchandise galore from a raft of merchants.

Closer to home, The Asylum Steampunk Festival ([www.asylumsteampunk.co.uk](http://www.asylumsteampunk.co.uk)) in Lincoln is billed as the world's "largest and longest running steampunk festival." Taking place over the bank holiday weekend (so 26th to 29th August next year), the festival includes a costume parade, art, literature, music, comedy, tabletop gaming, and it's run in a range of venues across the city, including Lincoln Castle.

### Do They Look Funny?

There's no getting away from the fact that steampunk isn't for everyone. As with many things surrounding technology and computing, it can be viewed as a bit geeky, and that can put some people off.

If you're even mildly interested in the genre, though, I'd recommend at least taking a look at some of the resources mentioned throughout this article. Steampunk's popularity has been on the up in recent year, and I'd say it's far from being merely a fad. Modern-day gaming successes have seen it thrust into the mainstream and I, for one, welcome this sub-genre for giving gaming, computing and modding a welcome shot in the arm. **mm**



# The State Of 3D Printing In 2015

**It's been the next big thing for a few years now, but is it really ready for the home? What advances have there been? Sarah Dobbs checks back in with the 3D printing 'revolution'...**

**A**ccording to the Gartner hype cycle, any new technology goes through a series of peaks and troughs until it settles down and becomes commonplace. First, after the technology is developed, there's a rapid rise in excitement, before it reaches a peak of inflated expectations. Then, interest drops off into a trough of disillusionment as people realise the hot new thing isn't all it's cracked up to be after all. Then, slowly, things pick up again until a plateau is reached.

It's the same kind of cycle we've seen over and over and over again with new gadgets over the years, and you probably don't need to see the diagram to recognise the pattern. We've seen it with digital cameras, with MP3 players, with touchscreens, and many, many other things before and after. It's not surprising, then, that 3D printing seems to be going through the same cycle. And right now, we're in the disillusionment phase.

## The Story So Far

Back in 2009, when a key patent for the fused deposition modelling method of 3D printing expired, it looked like 3D printing might be about to change the world. The expired patent meant that all kinds of companies could get to work making consumer grade 3D printers, and a flood of just about affordable printers hit the market. Over the next few years, those printers became more sophisticated and more affordable – plus easier to use. The world went mad for 3D printing,

painting it as an amazing technology that could change manufacturing forever. If consumers could invent, modify or fix things at home, the argument went, we'd see less waste and also way more creativity. Every kind of consumer product would be affected. Exciting stuff, basically.

The 3D printing enthusiasts reckoned things were only going to get more exciting too, as more 3D printing patents expired. Last year, a patent relating to laser sintering expired, potentially opening the gates to a new wave of home printers that could create 3D objects by cutting rather than layering materials. We were teetering on the brink of a whole new world.

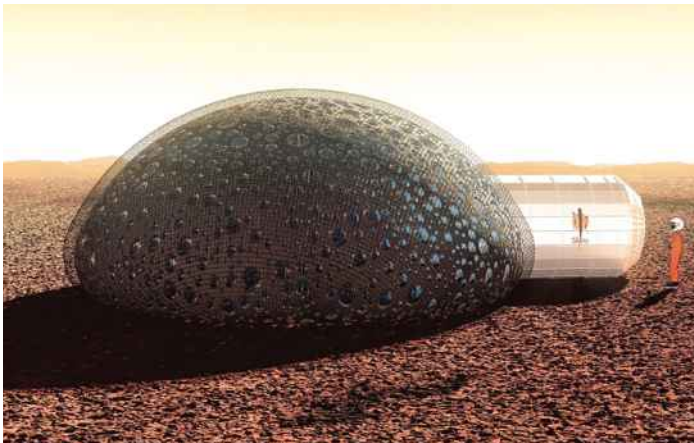
But, um... it didn't quite work out like that, did it? 3D printers are more accessible right now than they've ever been before. Some well-known technology retailers even carry them, though usually online rather than in-store. And most of the consumer printers around at the moment can be used by beginners, not just people with engineering degrees. Yet I'm betting that almost no one reading this has a 3D printer at home.

So why didn't home 3D printing take off? And why aren't we seeing as many headlines about 3D printing breakthroughs as we were, say, a year ago?

## Breakthroughs

Throughout 2012 and 2013, it seemed like there were new and hyperbolic headlines about 3D printing every week or so. Either a new





▲ Some 3D printing projects still capture the media's imagination – like this concept 'house' to be printed on Mars, created by designer Fabulous

method had been developed or a new service was launching or maybe a new material could now be 3D printed. There was always something. That's dropped off a bit now, though there have still been a few new developments. Recently, for example, Staples announced that it was partnering with Sculpteo to offer an online 3D printing service where customers can upload their designs and receive their printed objects in the post. Yes, it's technically already the service Sculpteo already offers, but it's interesting that a well-known retailer is drawing attention to it and making it more accessible to more people.

And just last week there was a new exciting 3D printing development at the Massachusetts Institute of Technology, as researchers announced they'd found a way to print clear glass. Glass is obviously a tricky substance to work with, but it also has some properties you'd associated with a 3D printable material (mostly, that it's liquid at hot temperatures but sets solidly), so scientists had been experimenting with ways to print it into programmable 3D shapes for a while. The problem had been creating a product that wasn't cloudy or opaque, but by developing a printer that works at very high temperatures and has three separate heating elements, the MIT team reckon they've cracked it.

The point of highlighting these two stories is that there are still lots of things happening in 3D printing, but maybe they're not as revolutionary-sounding as previous breakthroughs. And really, there are only so many Kickstarter projects for developing inexpensive printers

anyone cares to read about. So maybe the lack of headlines is just because the news isn't very exciting any more – or maybe people have just got bored reading about it.

## New Applications

The potential applications for 3D printing are, in theory, endless. And there are many industries that have already wholeheartedly embraced 3D printing. Good examples are dentistry, where models of patients' mouths can be printed and so can crowns, and the aeronautics industry, where prototype pieces can be quickly printed, tested and modified, considerably speeding up the development cycle.

Again, though, we haven't really heard much news about industrial applications for 3D printing lately. It could be that the technology has already reached a saturation point, where everyone who's likely to want to use 3D printing already is or it could be, again, that it's just not exciting to hear about new uses of 3D printing any more.

Particularly ambitious uses do still merit a mention in the newspapers. To pull out a couple more recent examples, there was a concept for a 3D printed 'house' that could be made and lived in on Mars that got some attention recently, plus a Spanish cancer patient recently survived an operation to install a 3D printed rib cage, both of which make for fascinating stories. But it seems like 3D printing itself has gone from an amazing futuristic concept to, well, a thing that we know can be done now. Unless someone's making something truly astounding, it's not enough just to print something.

## Home Printers

The bitterest disappointment of the 3D printing revolution that didn't quite happen isn't anything to do with astonishing advances in medical science or architecture, though; it's that most of us still don't have 3D printers to call our own. To go back to the hype cycle for a moment, according to Gartner's most recent predictions, consumer 3D printing is still around ten to 15 years away from productivity. That seems a long, long way off compared with the kinds of predictions industry experts were making just a few years ago.

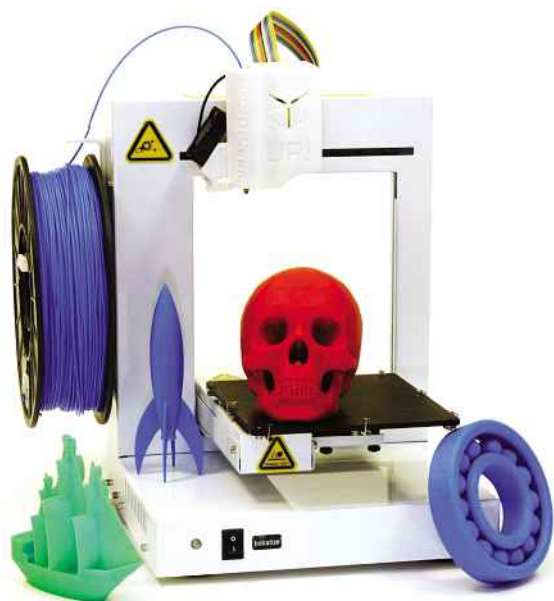
In fairness to consumer 3D printer manufacturers, progress has definitely been made in the kinds of machines that are available, and in how affordable they are. Some of the most popular 3D printers have dropped in price by hundreds of pounds over the last couple of years (see boxout for details!), and the 3D printers you can buy now are easier to use, more reliable and capable of producing more detailed prints than ever before.



▲ 3D printing services might end up more popular than home printers



▲ Plenty of cloud printing services already exist, but with big name retailers getting in on the act, they should get more attention



▲ *Consumer printers are more affordable and advanced than ever before – but does anyone want one?*

But the market doesn't seem to quite be there yet. Last year, around 108,000 3D printers were sold worldwide. To put that in context, in 2014 approximately 192 million iPhones were sold worldwide. There are undoubtedly many reasons why 3D printers aren't flying off shelves (lack of availability, high prices, perceived difficulty of use), but mostly it seems to be that people just aren't convinced they need them.

## The Future

What's next? Well, not to be defeatist or anything, but it seems likely that the utopian world of home 3D printers so many people envisioned in 2009 will never quite come to fruition. Most people don't have the time, knowhow or even inclination to manufacture their own products at home. That doesn't have to mean all is lost or that 3D printing is a failure, though. As previously discussed, 3D printing is still widely used in many industries, and it will continue to be useful to designers or in fields where one-off customisable objects are needed.

From a consumer perspective, what seems more likely is that 3D printing services will become more popular. Big name retailers seem to be interested in incorporating those kinds of services into their offerings. We've already mentioned Staples, and Asda has been slowly expanding its 3D printing Mini Me service to more stores across the country, after an enthusiastic response from customers when its trial version launched in York in 2013. So watch out for 3D printing 'photobooths' popping up in a shopping centre near you, any day now.

Undoubtedly, more advances will continue to be made in 3D printing, in all its guises. Just because we're not hearing about it as often doesn't mean it's gone away. And anyone who does want to spend the time and effort on at-home manufacturing should be rewarded with increasingly more effective, reliable and cheaper materials and machines.

If we had to guess, though, we'd say the thing that will generate a renewed flurry of interest and excitement around 3D printing won't be a cheaper consumer printer or an easy-to-use software suite; it'll be a breakthrough in printing electronics. The day someone figures out how to reliably 'print' the components of a mobile phone or laptop, you won't hear about anything else. Until then, well, we'll probably have to cope with feeling a bit disillusioned about the whole thing. [mm](#)

## 3D Printing Bargains

Still fancy getting your very own 3D printer? Well, the good news is that consumer grade 3D printers have come down in price quite a lot over the last two or three years. They're still not exactly cheap, but you no longer need to take out a second mortgage to afford one. Here are some of the best bargains available:

### Velleman K8200 3D printer kit

**Was: £699.99**

**Now: £399.99**

One of the first printers to be available in UK high-street stores, this kit is available from Maplin. It's dropped £300 in price since it first went on sale in 2013, and now it's one of the cheapest options around. You'll need to have some pretty good assembly skills, though, because you have to build it yourself, which may or may not be a deal-breaker.

### Up! Plus 2 3D printer

**Was: £1590**

**Now: £899**

The Up! Plus 2 is a pretty impressive printer, despite the awkward name: it's got automatic platform calibration, and the platform itself is heated, which means you can use more than one kind of plastic with the machine. Plus it's quiet and produces relatively high-res prints, and compared to its launch price a few years ago, it's also pretty affordable.

### Cube 3D printer

**Was: £1,195+**

**Now: £839+**

The models have changed over the last few years, with older versions retired and newer, swankier ones being launched, but where the cheapest Cubify printer used to be well over a grand, you'll now comfortably get enough change to buy a handful of different coloured filaments. (It comes bundled with white and neon green PLA, though, which is handy.)

### Ultimaker 2 3D printer

**Was: £1950**

**Now: £1699**

Considerably more expensive than other consumer-grade 3D printers, the Ultimaker 2 has at least come down in price over the last few years. And it's got a pretty good reason for its price: it's far bigger than most of the others in its class, which means it's capable of printing bigger objects. If you want to make more than just trinkets, this might be the one for you.

### 3Doodler v 2.0 3D printing pen

**Was: N/A**

**Now: £99.99**

The cheapest and easiest way to experiment with 3D printing, the newest version of the handheld 3Doodler 3D printing pen is available for under a hundred quid. The original was revolutionary in its way, but also unwieldy and uncomfortable to use. The new one looks and feels far more like a pen, and while you can't build massive structures with it, it's still a great introduction to 3D modelling.



# Top 5

# Addictive Tech Things

A few activities that are a little too hard to stop doing...

## 1 Online Gambling

Gambling makes several billions pounds every year in the UK, and it's hugely prevalent among the British population. In fact, excluding people who only play the National Lottery, 46% and 40% of women in the UK were said to have gambled in a 12-month period around 2013. Part of that success is no doubt thanks to the rise of online gambling. Here, users can easily fritter away their wages, benefits, birthday money or whatever on little games that could potentially earn them a few quid, but which normally just take their cash. We all know, the odds are always stacked in favour of the house, of course, but far too many of us get hooked, and the results can be truly damaging. The best option is probably never to start in the first place.

## 2 Online Shopping

Whether you're rich or poor, the lure of internet shopping is a strong one. You're basically able to walk freely up and down the aisles of a shop that has an infinite selection. Anything you could possibly want is right there on the web, and there are so many deals and discounts around, it's hard not to get sucked in. And that's without even taking into account eBay, where you have the added temptation of auctions to get you hooked. Our advice: when the couriers start addressing you by first name, it's time to put the credit card away.



▲ "What are you buying?" "I have no idea, but it's really cheap!"

## 3 Gaming

Videogames have always had an addictive quality to them, thanks to their inherent system of success and reward: you complete a level or beat a foe, and you feel good, plus you might unlock something new for your character. With online gaming, you have the addition of other people – real folk, just like you, whom you can interact with. Whether you're playing co-op or against each other, it's easy to find that 'one last game' of *Call of Duty* can turn into five or six, and you find yourself still playing at 3am, when you suddenly realise you've wasting a significant part your life and that you really should stop. Right after one more game, of course.

## 4 Social Networking

So you've just been on Facebook and posted a picture of your cat eating a sausage. Good stuff. Now you can go about the rest of your day, right? Wrong. What you actually end up doing is checking back every five minutes to see if anyone's Liked it yet or if there are any comments about it. Of course, you could just set up notifications on your phone or tablet, so you don't have to do that, but you still end up going back anyway, just to see what other people are up to (probably posting pictures of their cats eating sausages).

## 5 Upgrading

If there's one addiction we fully support, it's this one. They say power corrupts, and in the case of PC power, once you've got a taste, it's hard not to want more. More RAM, faster processors, better graphics and so on. 60 frames per second at 1080p – that's pretty impressive. But once you've seen that, why not aim for 120 frames per second at 4K? And once you get there, why not... well, you get the idea. Of course, the one thing that stops us all from upgrading ad infinitum (other than concerned loved ones) is lack of money. If it weren't for that, we'd probably be using a Cray supercomputer by now, buying literally everything on eBay and watching videos of cats eating sausages on a hundred 4K monitors, while simultaneously eying up whatever more powerful supercomputers are due to be released next.



# Google Picking Apples

**Mark Pickavance looks at the latest announcements from Google, and how some mistakes the company previously made are being addressed now**

It is the season for announcements. Like autumnal leaves falling, we've had Apple's latest hardware, we'll soon see Microsoft's, and coming in the middle it's Google's turn to shed some foliage.

However, for whatever reason, Google isn't as good at keeping secrets as its nemesis Apple, so almost all the new products in its September 29th presentation in San Francisco had been previously leaked.

Yet there are enough details that weren't complete and prices we didn't have to make this announcement still a truly interesting one. The first port of call was the Nexus phones, an area where many considered Google lost its way with the Nexus 6.

## Nexus 5X And 6P

Having owned a number of the Nexus 4 phones, I'm very keen on the pure Google experience that these devices offer. The Nexus 4 and 5 were top spec devices that were highly affordable. And then along came the Nexus 6, which seemed to want to compete directly in price with the very high-end Android devices made by HTC and Samsung.

In many respects, the 5X and 6P are a return to the previous philosophy of providing high-end hardware with a pure iteration of Android at an affordable price.

The Nexus 5X starts at just £339 for the 16GB model, and another £40 buys you the more ample 32GB capacity, and it comes in Carbon, Quartz and Ice colour schemes.

The colours are nice, but what's really likely to turn heads is the hardware specification, because the 5X is built for speed. Like LG's new G4, this phone uses the Snapdragon 808 processor, a 1.8GHz hexa-core CPU and Adreno 418 GPU. LG makes this phone as well, unsurprisingly.

It also gave it 2GB of RAM, fast charges using a USB-C port and a dedicated chip to process sensor information. The USB-C port banishes all those failed attempts to plug the cable in upside down, as it's reversible, but Google also claims that just ten minutes connected can get you four hours of use time.

That aspect is designed to undermine the Apple iPhone, and there are also some others in the 5X design that address Apple features directly.







The first of these is a fingerprint reader, but not placed on the front but on the middle of the back. The positioning allows the phone to be held more naturally for electronic payments and unlocking the phone for use, apparently.

The headline feature addresses one part of the phone design that Google has previously somewhat ignored: the camera. This really is something special, because in the rear facing unit it's managed to use a sensor with enormous 1.55 micron pixels, allowing for exceptional low light performance. It might only be rated to 12.3MP, but it offers an f/2.0 aperture, IR laser-assisted autofocus and can shoot 4K video at 30 frames per second. The forward-facing camera is 5MP, with a less impressive sensor, but it achieves the same f/2.0 aperture. The big differentiation with its larger 6P sibling is the screen, because the 5X's screen is 1080p, whereas the 6P has one even more detailed.

The Nexus 6P breaks ground in a few areas, but is also amped up in many of the same ways as the 5X. It's made by Chinese phone maker Huawei, and it's the company's first Nexus device. It's gone for a metal-clad monoblock design, mounting a 5.7" WQHD (2560 x 1440) AMOLED display that's protected with Gorilla Glass 4. Because of the relatively narrow border and the rear placement of the fingerprint reader, Google point out that this phone is actually the same size as many 5" screen phones.

Inside, Huawei has deployed the monster Snapdragon 810 2GHz octa-core processor, Adreno 430 GPU and 3GB of RAM, and matched that with 32GB, 64GB or 128GB of storage. While the rear camera is identical to the 5X, the front facer is enhanced to 8MP and can capture 1080p video at 30fps.

The 32GB model is £449, 64GB is £499 and the whopping 128GB option is £579. Those prices make it significantly cheaper than the latest Apple devices, where the 64GB iPhone 6 Plus costs £619 and there's no 128GB option. The entry-level 6P is £10 cheaper than the year-old iPhone 6 with just 16GB of storage, if you like a stark comparison.

A major focus for Google in both the 5X and 6P is battery life, with them both having larger batteries than the Nexus 6, and the 6P has one of the biggest ever in a smartphone at 3,450mAh.

Also, according to the presentation, both phones operate at least 30% more efficiently due to the superior power and app management that Android 6.0 Marshmallow provides.

However, the advent of this new level OS isn't all good news for those with recent Nexus devices.

### Marshmallow

A good portion of the presentation highlighted the advances that the latest Android incarnation, Marshmallow, brings to the Google ecosystem. According to Google, this release is a multi-pronged assault on critical areas in the OS to improve the general user experience.

I've already mentioned the power management, but there are also enhancements in how apps interact with the user, each other and also the Google cloud infrastructure.

“ For whatever reason, Google isn't as good at keeping secrets as its nemesis Apple ”

In a subtly iconic section of the show, where the presenter worked with a collection of images of children picking apples, some of these features were showcased. It's now possible with the photo app to send a picture collection link to another user and have them add their own images, providing a simple and immediate means to collate images from an event without using a special application or web tool.

App interaction has also been enhanced in the Android 6.0 API, allowing you to search for a restaurant based on a message mentioning the location and then even book a reservation without moving out of the conversation. Other enhancements include more control over the lockscreen, as-needed security sanctioning, better text selection and paste functionality, and enhanced security that works with the fingerprint hardware on the 5X and 6P.

Visually it's not much changed from Lollipop, but under the interface it looks dramatically revamped and able to better exploit the more powerful hardware that phone makers are using moving forward.

Only time will tell if this version has a more dramatic take-up than Android 5.x, which is on only 1.6% of all Android





devices. Currently the vast majority of Android phones and tablets use the much older KitKat (4.4) or Jelly Bean (4.1 or 4.2) versions.

## Pixel C

Google has produced a number of devices under the Pixel branding that have all been very expensive Chromebooks. The new Pixel C entirely contradicts that prior history by being inherently a tablet but also using the Android platform. With more than a mild homage to the Microsoft Surface, the Pixel C is a hybrid design built around the powerful ARM-based Nvidia X1 processor.

Presentation attendees were generally very impressed with hardware, with many remarking how beautifully made it was, and how light it seemed. The two stand-out features that really wowed the Google fans were the superb 2,560 x 1,800 resolution screen that boasts 500 nits of brightness and an impressive colour gamut, and the optional magnetically attached keyboard. The flipside of the high portability of this device is that the screen is only 10.2 inches, though at 7mm thick, this is so thin it makes some of the Apple tablet devices seem stout by comparison.

The keyboard uses a similar switch mechanism to that of the earlier Pixel Chromebooks, which was very well considered, and it connects to the tablet by some powerful magnets. How strong these magnets are was covered in the presentation:

once the two are attached, you can hold the Pixel C by either keyboard or screen with equal confidence.

Android on the Pixel C can detect if the keyboard is connected and allow input through that rather than an on-screen input. The peripheral communicates via Bluetooth, and a small battery in the keyboard powers that functionality. The battery is charged by the tablet when the keyboard is folded under it using magnetic induction.

As with the Surface, Google has chosen to sell the keyboard as a separate and not inexpensive accessory, so it will be interesting to see if people buy the Pixel C with or without one.

The cost of the Pixel C in the UK hasn't been made available yet, but the US cost of the device is \$499 (£330) for the 32GB model and \$599 (£396) for the 64GB one. The keyboard will cost \$149 (£98), and both are expected to arrive here before Christmas.

## Chromecast And Chromecast Audio

The Chromecast has been one of those inexpensive devices that many bought almost out of curiosity about what it might do.

The second generation device is more powerful, has enhanced capabilities like AC class wi-fi, and yet it costs exactly the same £30 here in the UK. When combined with Marshmallow control devices, a whole new range of capabilities open up, including the ability to stream multiplayer games with up to four people, and handle an even greater selection of streaming

### How The New Nexus Models Shape Up

	Nexus 5X	Nexus 6P	iPhone 6S Plus	Galaxy S6	Moto X Style	Nexus 6
<b>Display</b>	5.2"	5.7"	5.5"	5.1"	5.7"	5.96"
<b>Resolution</b>	1920 x 1080	2560 x 1440	1920 x 1080	2560 x 1440	2560 x 1440	2560 x 1440
<b>Processor</b>	Snapdragon 808	Snapdragon 810	Apple A9	Exynos 7420	Snapdragon 808	Snapdragon 805
<b>Clock/Cores</b>	1.8 GHz hecta-core	2.0 GHz octa-core	1.8GHz dual-core	2.1GHz and 1.5GHz octa-core	1.8GHz hexa-core	2.7GHz quad-core
<b>RAM</b>	2GB	3GB	2GB	3GB	3GB	3GB
<b>Storage</b>	16GB, 32GB	32GB, 64GB, 128GB	16GB, 64GB, 128GB	32GB, 64GB, 128GB	16GB, 32GB, 64GB	32GB, 64GB
<b>Rear Camera</b>	12.3 MP	12.3 MP	12 MP	16 MP	21 MP	13 MP
<b>Front Camera</b>	5 MP	8 MP	5 MP	5 MP	5 MP	2 MP
<b>Battery</b>	2,700 mAh	3,450 mAh	2,750 mAh	2,550 mAh	3,000 mAh	3,220 mAh
<b>Weight</b>	136 g	179 g	192 g	138 g	179 g	184 g
<b>Dimensions</b>	147.0mm 72.6mm 7.9mm	159.3mm 77.8mm 7.3mm	158.2mm 77.9mm 7.3mm	143.4mm 70.5mm 6.8mm	153.9mm 76.2mm 11.1mm	159.26mm 82.98mm 10.6mm
<b>Starting Price</b>	£329	£449	£619	£499	£399	£369





services. It also comes in three colours, for those who like tonal coordination for hardware that's generally out of view.

Alongside the new and enhanced video casting device is the Chromecast Audio which, as the name suggests, is entirely designed to distribute music throughout your home. The cheeky design of this device, mimicking a vinyl record, belies some very clever technology that Google put in it. Rather than

“ The revamp of the Chromecast is very welcome, and the audio version could get some real traction ”

focusing on streaming from a phone or tablet, Google has designed this hardware to link directly to music services like Spotify, so once tracks are being played, the initiating hardware doesn't need to be involved. You can still control them using an Android phone, but they'd keep the music playing even if the phone was turned off or left the location.

For £30, again, Google is offering the potential to turn any old stereo or set of speakers into the equivalent of a Sonos sound system. It's also promising a 'party mode' where multiple sound systems throughout a house can be subtly time staggered to sound in sync in the near future.

### Final Thoughts

Overall, there was plenty of interesting technology on show that is affordable even by those who don't work in 'the valley'. Or that's the general impression, even if a few minor details didn't quite fit like crafted jigsaw pieces.

Generally, the 5X and 6P phones look great, but as a few people noted, these are also the first since the Nexus S that don't support wireless charging. A better camera is now a prerequisite of a decent smartphone, and from the examples so far presented, the one in these is really good.

At the price Google is asking for the Nexus 5X, a borderline premium device, I can see it shipping plenty of these. However, for those that don't mind a larger phone with an amazing screen, the 6P's price isn't unreasonable either.

What was missing here was a replacement for the Nexus 7 tablet. However, the fact that Google is supporting the 2013 model with Marshmallow makes me think it really ought to keep selling them, if it can convince Asus to make some more.

Where I can accept that the Nexus 4 should probably be left on Lollipop, Nexus 10 tablet owners are unlikely to be thrilled that they're being disavowed at the same time.

As for the Pixel C, this product poses more questions than it answers, especially in respect to where Chrome OS and Android merge or not. From those that got a hands-on experience, there was much praise for the design and the keyboard, though sales figures are yet to confirm that people really want hybrid systems as much as Microsoft, Apple and others appear to think they do. How that product pans out could entirely dictate if there is every another Nexus tablet from Google, I suspect.

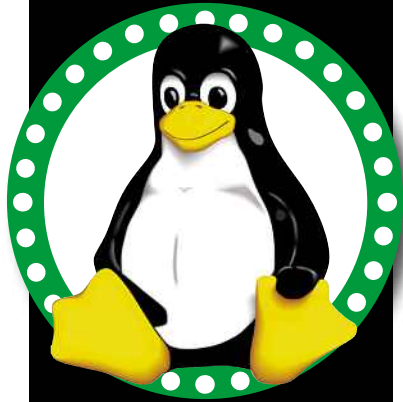
The revamp of the Chromecast is very welcome, and the audio version could get some real traction especially in the USA, where they have homes big enough that sound doesn't travel easily through them.

For those who like and use Google technology there was pretty much something for everyone, and plenty for those who are interested in their next smartphone purchase and want a change of scenery.

What was apparent was that Google is more aggressively targeting those areas that Apple has traditionally excelled in, with products that are priced to entice customers away. As Apple categorically refuses to compete on price, it may find itself challenged in a number of product lines by these developments.

What impressed this writer specifically was that within ten minutes of the presentation ending, it was possible to go to Google's Play store and order almost every item shown, with the exception of the Pixel C, with less than a month delivery time on the phones, and just a few days on the Chromecast devices.

Google obviously mean business, should any of its competitors be in any doubt. **mm**



David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

# LINUX

# Make Linux Look Like...

## Mimicking another OS

I've always been slightly baffled by the reams of information out there that instruct you how to make your Linux look exactly and almost behave exactly like either Windows or a Mac. Why?

Okay, so it's a bit of fun to have a Linux distro themed to resemble the latest Mac UI, and I'll go as far as saying that a Mac UI is a very pleasant thing to behold and generally a little better looking than most of the Linux distros I've come across over the years.

The same could be said for Windows, to some degree. Windows 10 is a good looking UI, I personally think, and I never had any problems with the tiles in Windows 8 either. That said, I'm not going to try to make a Linux installation of mine look like it.

I suppose it's an interesting project to get to grips with, and it'll familiarise you with elements of the OS you probably wouldn't normally touch. Experimentation is good in technology; that's

how most of us learned how to use our preferred desktop operating systems.

There's also the theory that a former Windows and Mac user could get to grips with Linux easier if it looked a little like an OS they're familiar with. However, I don't really buy into that one too much.

It's not a bad thing to make a Linux distro look like a Mac or Windows OS, but to me it just seems a little pointless.

## What's Wrong With The Linux Desktop?

Fair enough, there are some desktop environments that don't look or feel too appealing. Gnome 3 when it was released didn't quite fit the bill for many users, and the same could be said for Unity too. However, with Linux being as dynamic as it is, it doesn't take a great deal to change a desktop environment to something that you do like – be that MATE, Cinnamon, KDE, Xfce, LXDE or countless others.

So when an article crops up with the promise of making

Linux look like another OS, while I'll read it for the sake of learning about the technology behind it, I do frown at the why aspect of it. I mean, why can't Linux simply look like Linux? Stop comparing the different OSs and simply enjoy them and use them however you wish or to fulfil your needs.

## The Gela Theme

Anyway, the point is that I recently read about the Gela Theme, a Gnome shell theme that looks rather splendid on its own but which can be used in conjunction with a number of other elements to create a very Mac-like look on a Linux desktop.

I dug a little deeper and found the Windows 7 theme pack for Unity, where you can make your Ubuntu build look like the familiar Microsoft UI (sudo apt-get install win2-7). And there's also the MacBuntu Transformation Pack, fully updated for the latest Ubuntu and Mint distros ([goo.gl/op7JQJ](http://goo.gl/op7JQJ)).

There are just a couple of examples, but I'm interested in what you think. Is making Linux look like another OS a handy tool to help you learn the system and a fun project? Or should it just be brushed under the carpet so we can enjoy Linux with the various desktop environments already on offer?



◀ Nope, it's not a Mac. It's really Ubuntu themed to look like one

# A Sense Of Focus

**When apps are almost identical across OS X and iOS, is that a good thing?**

Given that I'm a writer, it should come as no surprise that I tend to spend a lot of time in text editors. I long ago gave up on perennial 'favourite' Microsoft Word. This wasn't because of any kind of ill-judged anti-Microsoft sentiments. In reality, Word's not a bad app on the Mac, but it had long felt far more than a focused tool for writing. Much like Apple's Pages, Microsoft's software half the time seemed desperate to tread on the toes of layout packages like InDesign. And even though recent editions have more stripped-back writing modes, I tend to strive for something simpler.

For the most part, minimal text editors are where it's at for me. I started out with WriteRoom and then moved to Byword. For more complex projects, I'll wheel out the superb Scrivener. I've also checked out Ulysses for note-taking and fashioning larger articles, and iA Writer for working on shorter pieces.

The last two applications in particular are now really quite interesting, in terms of how they approach a focused user experience across platforms. In many cases, friction when working with an application comes from a lack of familiarity – and you might argue that this is something Microsoft has been attempting to tackle with its desire to get 'proper' Windows everywhere. But on iOS, what you get is a world away from the Mac and OS X.

Software, though, can bridge any perceived divide through the freedoms afforded to individual user interfaces. Thus, when you first launch Ulysses for iPad, you'll perhaps stop for a

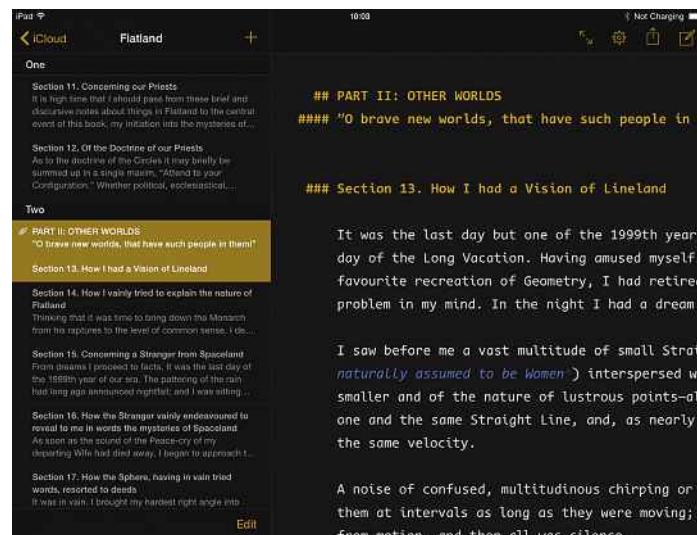
moment and question whether you're suddenly looking at your Mac's display from a distance. The app is practically identical to its OS X cousin – only, because it's utilising standard iOS interface components, it actually looks a bit nicer.

With its latest 3.0 upgrade, iA Writer is in somewhat similar territory. In fact, you might say it goes a bit further, because the iOS app is almost unnervingly desktop-like, but the desktop app borrows conventions from mobile. In the former case, there's a menu bar and drop-down menus – something that's almost entirely absent from other iOS software. Oddly, though, it works. I'm not sure I'd want to plough through an iPad Photoshop in this manner, but with the relatively few commands available in iA Writer, it feels like a familiar and usable means of getting things done. And on the desktop, there's quite a lot of swiping, in order to open the Library (where saved files are stashed) and Preview (to check how your Markdown's being interpreted). There's

an effortless lack of thinking, like you have when using a touchscreen, but transferred to a trackpad. It works really well, to the point you wonder why other applications haven't followed suit.

None of this is a plea for more software to somehow become identical across Apple platforms. I don't want an iMac that runs iOS any more than I want OS X on my iPad (that is, not at all). Each system has its own strengths, and I'd sooner see developers playing towards them with the software they design. But with the apps that are strictly about getting things done – helping you achieve a kind of razor-sharp focus – that sense of already knowing how to use a new version of an app the second you launch it can be very useful indeed. However, if Apple's 3D Touch on iOS ends up becoming that system's 'right click', I might have to rapidly revise this line of thinking.

▼ *On iPad, Ulysses looks and works much like the Mac version – surprisingly, a good thing*



**Craig Grannell is a writer, designer, occasional musician and permanent loudmouth. He's owned Macs since 1996, when Apple was facing certain doom, and is therefore pleasantly surprised by its current success. Find Craig on Twitter at @craiggrannell**

# Mac





# Nexii

**Google announces more new shiny things than usual, and Ian McGurren is impressed**

Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

# Mobile

I really like autumn. It's a beautiful time of the year, when nearly all sunlit hours look like the photographic magic hour, all rich colours and soft sunlight. Then there's the fun of Halloween and the bombastic start to the cold nights and lead-up to Christmas that is Bonfire Night too. It's pretty much my favourite season, though I could do without spiders. Autumn is also the best time for mobile tech too, with the simultaneous releases of new hardware and operating systems from both Apple and Google. Hot on the heels of Apple's announcement comes the newly designed Google's turn, and this year it was a little different.

There have been rumours for some years of Google's flagship handsets (well, technically speaking, only handsets) going from being one device to becoming a catch-all 'brand' that would be licensed to other manufacturers. Evidence for this has popped up in the past with the Google Play Edition devices offering vanilla Android on non-Google handsets, as well as Google's constant switching of Nexus hardware manufacturers. This year, though, while we still don't have Nexus-brand licensing, we do have not one but two new Nexus handsets, including from a previously unused manufacturer.

Actually, new isn't quite right in the case of the Nexus 5X, given that it's an update to 2013's Nexus 5. However, that won't bother too many, as the Nexus 5 is still regarded as one of the best Nexus handsets made, even more so than 2014's Nexus 6. The 5X is again made by LG and retains a very similar design, one far easier to

handle than the Nexus 6. The 5X is actually marginally bigger, with a 5.2" screen that Google describes as "compact"! It still has many of the same specs – 1080p screen, 16GB or 32GB storage, no micro-SD – but with bumps where it matters. The SoC is a hexa-core Snapdragon 808, and the camera is now 12MP. RAM, however, is also still 2GB, to the chagrin of some. The Nexus 5X will launch in the UK shortly, starting at £299.

The more interesting of the two is arguably the Nexus 6P, from first time Nexus-er Huawei. The Nexus 6P replaces the Nexus 6 but doesn't actually have a 6" screen any more, possibly to the approval of many who found the Nexus 6's screen just too big (including yours truly), while also presenting a far more attractive shell that may or may not have a passing resemblance to Apple and Samsung's finest. In terms of specs, the Nexus 6P is also bigger than the 5X, with a 2GHz octa-core Snapdragon 810 having a spacious 3GB RAM to play with. The screen is still QHD and AMOLED, albeit the smaller size makes for a marginally higher ppi

(518 against the 6's 493). The Nexus 6P starts at £439 for 16GB and is also soon to hit the shops.

Both units not only launch with Android 6.0 Marshmallow but have rear-mounted 'Nexus Imprint' fingerprint sensors, ushering in the likelihood that the remaining Android flagships in 2016 will also have fingerprint readers. They're also the first Nexus devices to adapt USB-C for their charging and data port, again a standard that looks to be in place in many more handsets in the coming year.

After the (too) big disappointment of the Nexus 6, it's encouraging to see Google address two of that device's main problems by making a better big phone and making a well-priced phone – and then cheekily doing that as two separate devices. Bringing the much loved Nexus 5 bang up to date and releasing a genuinely attractive phablet is a clever way to do both and make more money. How they'll stand up against the iPhone 6S's Apple-ness, the Galaxy S6's curves and the ever-more-impressive budget devices is yet to be seen. As a brand, however, Nexus is back.



# The Tech Pioneer

Sir Clive Sinclair is ahead of his time, says Andrew Unsworth

Steve Jobs is widely regarded as a pioneer and treated like some kind of tech messiah by some, and not without reason. It was under his direction that Apple popularised mobile computing for the masses, after all, and if you ask me, and I'm sure that you would, that has been a good thing.

However, there is in my opinion a far more deserving tech pioneer, and that is Sir Clive Sinclair. It was Sir Clive who popularised home computing in the UK with Sinclair's ZX80, ZX81 and ZX Spectrum computers. Those of us in our mid-30s who can program a computer probably caught the BASIC bug while working through the examples in the programming manual that came with the ZX Spectrum or by hacking pokes from *Your Sinclair* into the Speccy's interpreter.

However, Sir Clive Sinclair isn't only a populariser of home computers; he's a true inventor in possession of a genius and imagination far ahead of their time. I've been thinking this for a while, but even more so in the last week.

It was Sir Clive Sinclair who pioneered the portable TV, and although these devices had a section in the Argos catalogue (I remember fondly looking at them and adding a portable to one of my many pleading missives to Father Christmas), I don't know of anyone who had one. Were these devices popular? I'm not sure that they were. Goodness knows how long the batteries lasted. Yet Sir Clive's vision of truly portable television has been realised in the form of smartphones and tablets. Portable televisions are ubiquitous. I was reminded of

Sinclair's portable TVs when watching a video in my iPad in the grounds of a rural hotel, and then again a couple of days later when I saw other people doing the same thing.

The other day I was chatting to people about electric cars, and a couple of people had test-driven them, as well as hybrids, with a view to buying one of them. We laughed and joked about the genuine fun

but truly mainstream with support from major motoring manufacturers would have seemed far-fetched even 15 years ago, never mind when the C5 was released. Yet Sir Clive's vision of clean, electric personal transport has come to fruition.

Sir Clive has done the best that he can do with the technology he has had available at the time of his many inventions, but his ideas have

“ Sir Clive Sinclair isn't only a populariser of home computers ”

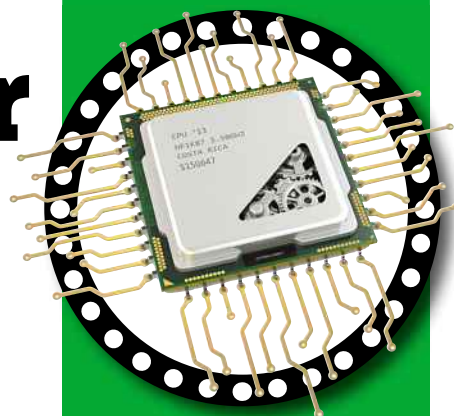
to be had in the Renault Twizy and how electric cars have ranges that make them viable as run-arounds.

If you haven't seen it, the Renault Twizy is a slim electric car with room for one person in front and room for a single passenger in the back. It reminds me of the Sinclair C5, even though the Twizy has four wheels and a roof.

The idea that electric cars could become not just an option

had to wait for technology and the rest of humanity to catch up with him for them to become truly viable and mainstream.

Much has been written about Clive Sinclair, and many will wonder why more needs to be written about him, but I can't let the thoughts I've had over the last couple of weeks go unvoiced. Next time you're down the pub, please raise a glass of your favourite tippie in honour of the man.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

# Hardware



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*



Cybernetic bodies, cerebral augmentations and World War II tanks? It's all part of the plot Treyarch has in store for us in *Black Ops III's* solo campaign

## This week, Ryan takes a look at the details behind *Black Ops III's* solo campaign, and checks out the new additions to *Elite: Dangerous...*

### Plug & Play

Activision can typically bank on the autumn months belonging to the *Call Of Duty* franchise. This year, however, *Black Ops III* has an unusually powerful rival: EA's *Star Wars: Battlefront*, which is also out in November. While *Battlefront* has the allure of X-wings, TIE Fighters, Darth Vader and John Williams' irresistible score, *Black Ops III* has one thing the *Star Wars* game doesn't: a single-player campaign.

Say what you will about the brevity of *CoD's* recent story modes, at least Activision is sticking with them – even if they're only a small part of what makes the series one of the most successful on the planet. Like the *Modern Warfare* strand of the franchise, *Black Ops III* will take us into the not-to-distant future of 2065, where robotics and cerebral implants have resulted in a new breed of armoured, athletic super soldier. The latest trailer ([youtu.be/k2GMPVXLGbk](http://youtu.be/k2GMPVXLGbk)) gives a fresh insight into the campaign's tone and events, which are best described as *Apocalypse Now* meets *Elysium*. The trailer also features a jarring use of the f-word, which might, unless we're much mistaken, be the first time we've encountered one in a *CoD* trailer.

"I wanted to be a killing machine," growls a character named John Taylor, voiced by *Law & Order's* Christopher Meloni. There's a brooding atmosphere to the trailer akin to the *Deus Ex* series, which extends to the chatter about a "direct neural interface". What will this augmentation do? It's not yet clear how it'll affect the game itself, but the positive and negative effects of having a computer-boosted brain is evidently the driving force behind the story. The plot also appears to take in some kind of internal war between *Black Ops* soldiers, and it isn't entirely clear whose side we'll

be on. And, lest you think it all sounds a bit too moody and heavy, there's a scene where a guy's thrown off a balcony, and in one spectacularly weird and unexpected moment, a tank comes crashing through a wall. Closer inspection appears to confirm that it's a German tank from World War II. What on Earth's going on? Are we in for a bit of *Assassin's Creed*-like time hopping? Are the characters *Universal Soldier*-like veterans from WWII, thawed out and returned to duty? We'll just have to wait and see.

*Call Of Duty: Black Ops III* is out on the 6th November.

### Pokemon In Minecraft?

We've seen all kinds of exotic and ingenious things built in *Minecraft* over the years, but what about a working version of the original *Pokemon* on the Nintendo Game Boy? That's what one user, Magib1, has been working away on for the past two months. It sounds like an unfeasibly complex thing to get up and running within the game, but footage appears to prove that it works: hero Ash Ketchum is shown wandering around a monochrome map just like the original 1996 game. "It is a rather ambitious project," its designer says. He plans to have a fully working *Pokemon* game working within the next four months.

► You have to admire the dedication: someone's building a working version of *Pokemon Red* on the Game Boy... inside *Minecraft*







▲ Combat the loneliness of space travel with Multi-Crew, the new mode coming to *Elite: Dangerous* that will allow multiple players in one ship

## Online

*Elite: Dangerous* offers a colossal universe to explore, but all that travelling and trading can sometimes get a little, well, lonely? *Elite's* developer Frontier Developments have clearly been thinking about this, because it's preparing to launch something called Multi-Crew. As its name implies, the forthcoming update will allow multiple players to travel around together in the same ship, with each player able to take on a different aspect of flying their craft and controlling its weapons systems.

"Multi-Crew lets you fly in the same ship with friends, which will up the intensity and camaraderie levels of a joint mission even further!" Frontier wrote in a recent newsletter. "You'll be able to share and alternate control of weapons systems, turrets and flight duties to multiply your effectiveness. Even to the extent of piloting a ship-launched fighter and working in combination with the mothership. It'll be especially useful in some of the very large trading ships coming in season two."

As part of Multi-Crew, Frontier are also adding avatars, which players will be able to alter and customise as they see fit. "The all-new Commander Creator brings your in-game presence to life for the first time," the studio write, "and lets you identify friends with a quick glance across your ship's bridge."

These additional features are all part of the *Horizons* "season of major gameplay expansions" Frontier has pegged for release next year. Back in August, we heard of the update's first big addition: the ability to land on planets. With the Planetary Landings expansion, we'll be able to bomb around on planet surfaces in a vehicle called the Scarab, which means we'll be able to go mining for mineral deposits, salvage valuable stuff from crashed ships and do battle with enemy forces.

As you may have already observed, *Horizons* isn't particularly cheap, particularly if you're an existing *Elite: Dangerous* player – the DLC by itself will cost £30, while newcomers can buy the base

game and the add-on for £40. The content Frontier's adding to *Elite: Dangerous* is hugely ambitious, though, and if all goes according to plan, could make the studio's already vast space sim more sprawling than ever. Expect *Horizons* in late 2015.

## Incoming

Pre-orders are a common, if often controversial, marketing tactic these days. In the case of the forthcoming *Deus Ex: Mankind Divided*, however, it seems that Square Enix misjudged the public's mood on the matter. In August, it announced a, frankly, bizarre 'Augment Your Pre-Order' promotion – in essence offering Kickstarter-like tiers, where more pre-orders the game added up

to more bonuses for its early purchasers – incentives included additional in-game items and missions, which built to a top tier, which would have seen the game released four days earlier.

The online response to the campaign wasn't exactly positive, though with many rightly pointing out that all the bonuses except the early release already available to purchasers of game's 'collector's edition'. Well, Square have since cancelled the programme, with the bonuses now available to everyone who orders early. Square has also announced that the sci-fi sequel will be arriving on the same date for everyone – so look out for *Deus Ex: Mankind Divided* on the 23rd February 2016.



▲ Square Enix's controversial 'Augment Your Pre-Order' scheme has now been cancelled following negative feedback from fans

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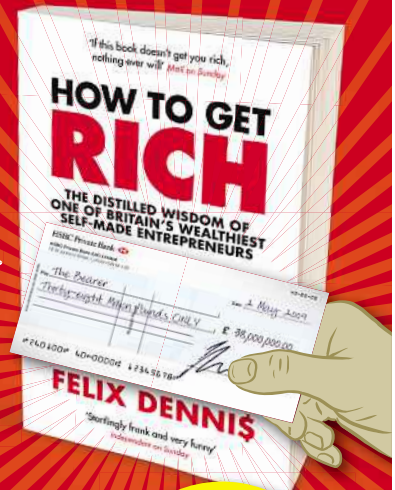
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Email: [bob@docbobs.com](mailto:bob@docbobs.com)

**Dell Latitude E5420 i5.** Very fast 2.5, 4GB RAM, 500GB HDD, DVDRW fantastic condition. Cheaper than any on Ebay. Very good battery life. You can collect from Manchester or Portsmouth or I can courier out to you next day for an extra £10. Please call all email for any questions. It has Windows 7 64 bit installed and activated with a genuine certificate of authenticity.  
NEW £125.  
Tel: Dave Thomas (07828) 982930 or (01942) 706571  
Email: [davethomas96@aol.com](mailto:davethomas96@aol.com)

**Acer Aspire 1670 laptop.** No hard disc. Otherwise in excellent condition. In laptop bag. £45.  
Tel: David (07901) 994958

**NVidia Quadro 600 GPU.** 1GB DDR3, Dual link DVI-I + Display port. Max. Display at 60Hz + 2560x1600, Direct X 11, Open GL 4.4. The best per watt in its class. Big performance, small form factor, small power consumption. From my working Win8 PC. £32.50 inc post. .  
Tel: Dave (01206) 298773  
Email: [ochdgh@aol.com](mailto:ochdgh@aol.com)

**2 x 2GB OCZ Gold Series DDR2 RAM.** PC2 8500, (matched pair) P/N OCZ2G10664GK 5-6-6 2.1v Removed from my working machine. £40 the pair incl. reg. post.  
Tel: Dave (01206) 298773  
Email: [ochdgh@aol.com](mailto:ochdgh@aol.com)

**MOTHERBOARD + RAM + GRAPHIC CARD BUNDLE.** Asus P5QL SE + OCZ 4Gb RAM + 1Gb Quadro PCI-E Graphic Card. SEE SEPARATE ADS FOR DETAIL. From my Windows 8 machine. BUNDLE: £105 Incl. Reg. P&P  
Tel: Dave (01206) 298773  
Email: [ochdgh@aol.com](mailto:ochdgh@aol.com)

**Compaq/HP nc6320 Laptop.** Core 2 Duo 1.8mhz, 512 Ram, 80gb Hard drive DVDRW Win 7 Professional COA. Memory can be upgraded for an extra charge. Very good battery life. Collect from Manchester or Portsmouth, courier delivery for an extra £10. Please call all email for any questions. It has Windows 7 32 bit installed and activated with a genuine certificate of authenticity. Refurbished £60.

Tel: Dave Thomas (07828) 982930 or (01942) 706571  
Email: [davethomas96@aol.com](mailto:davethomas96@aol.com)

**Dell D830 laptop.** Core 2 Duo T8300 2.4MHz (very fast) 2GB RAM 120GB HDD, DVDRW Genuine Win 7 pro 32-bit activated. Fantastic condition. Good battery life. Collect from Manchester or Portsmouth, courier delivery for £10. Call/email with questions. Refurbished. £80.  
Tel: Dave Thomas (07828) 982930 or (01942) 706571  
Email: [davethomas96@aol.com](mailto:davethomas96@aol.com)

**Dell XPS12 Ultrabook.** 4th gen i5, 4GB RAM, 128GB SSD 10 point touch 12.5" 1920 x 1080 Display, Backlit US Keyboard, Wireless-AC, Bluetooth, USB3. £395  
Tel: Ian (01932) 856971  
Email: [a2345@btinternet.com](mailto:a2345@btinternet.com)

**NON ECC LOW DENSITY LAPTOP MEMORY MODULES. DOUBLE SIDED RAM.** Working Laptop pull, Please double check as No returns due to incompatibility. 8GB 2 X 4GB Crucial 204 Pin SODIMM 512Mx64 DDR. CT51264BC1067. M16FD BV1111Z.FS 201106 SU £27.50 the pair incl. Reg. p&p  
Tel: Dave (01206) 298773  
Email: [ochdgh@aol.com](mailto:ochdgh@aol.com)

**Laptop for sale.** HP NC 6400 Core 2 DUO 2.0MHz 3GB ram 80GB HDD, DVDCDRW Fingerprint reader, Fantastic and fast . Windows 7 32-bit professional. Only £60 plus £12 for next day delivery.  
Tel: Dave Thomas (07828) 982930 or (01942) 706571  
Email: [davethomas96@aol.com](mailto:davethomas96@aol.com)

**Desktop PC. Zalman T3 case,** 3.4GHz CPU, Asus Motherboard, Seagate 500gb HDD, Samsung Optical drive. 4gb Kingston RAM Wifi & Ethernet, Genuine Win7 Ultimate. Collection preferred from Flintshire or willing to discuss options. £150.  
Tel: Paul (07900) 796780  
Email [n-peckadd@5kid5.net](mailto:n-peckadd@5kid5.net)

**2 x 2GB OCZ Gold Series DDR2 RAM.** PC2 8500, (matched pair) P/N OCZ2G10664GK 5-6-6 2.1v. Removed from my working

machine. £40 the pair incl. reg. post.  
Tel: Dave (01206) 298773  
Email: ochdgh@aol.com

**Asus Z97 Gryphon Armor Kit.**  
Steel backplate with plastic top and auxiliary fan. Also some minor plastic bits. £20. Email for details.  
Email: graham\_rocknell@yahoo.co.uk

**27" iMac.** 2.9 GHz Intel i5, 1TB HDD, 8GB RAM – late 2012 Model (thin edge) iMac in good condition, running OSX Yosemite. No keyboard or mouse, original box. £700. Tel: Chris Salter (01707) 880251  
Email: ChrisSalter@hoarelea.com

**Compaq/HP 6910p Laptop.** Core 2 Duo 1.8mhz, 2gb Ram, 160gb Hard drive DVDCDRW Win 7 Professional COA. Cheaper than any on Ebay. Very good battery life. You can collect from Manchester or Portsmouth or I can courier out to you next day for an extra £10. Call or email any questions. It has Win 7 32-bit installed and activated with a genuine COA. Refurbished £60.  
Tel: Dave Thomas (07828) 982930 or (01942) 706571  
Email: davethomas96@aol.com

**PC Desktop Ram (DIMM)**  
Memory. Siemens PC100 - 222- 620 16M x 64 SDRAM. HYS64V16222GU-8 Only £8.  
Tel: Gordon (01314) 660205  
E-mail: scobieg09@gmail.com

**ASUS P5QL-EPU Motherboard**  
- 775 Socket - DDR2. Tested and taken from a working environment, comes with I/O Plate. £45 inc Free Courier. Payment via PayPal.  
Email: info@jmcomputing.info

**ANTEC 2800 MIDI-TOWER.**  
Black Antec case, Sempron 2800+, Gigabyte m/board, 2GB RAM, 80GB Hard-Drive, DVD-RW, 10/100 Network. Clean install of Windows XP, Office 2007, fully updated & activated, all usual utilities, XP COA on case. £39 (P&P £15).  
Tel: Pat (07710) 348638  
Email: pat4cars@aol.com

**OPTERON 185 WORKSTATION.**  
2.6GHz Dual-Core, Freezer 64, 4GB RAM, 160 + 300GB, CD-RW, DVD-RW, Floppy, network Card, Soundblaster , NVideo , Vista

Business, fully updated & activated, with copy of install media & working activation number. £79 (P&P £15).  
Tel: Pat (07710) 348638  
Email: pat4cars@aol.com

**Laptop for sale.** HP Compaq 6910p Core 2 DUO T7300 2.0mhz 3gb ram 80gb hard drive DVDCDRW Fingerprint reader fantastic and fast , Genuine win 7 35 bit professional Only £60 plus £12 for next day delivery. Fantastic condition, very fast.  
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Email: davethomas96@aol.com  
**WD 500GB external USB HDD.**  
Excellent Condition. £20 inc. P&P.  
Tel: Michael Cunnane (01452) 303732

**KINGSTON 120GB SOLID STATE HARD DRIVE.** For sale 120GB Kingston solid state hard drive model SSDnow V300 2.5" Sata3 - compatible with Sata2. Very fast drive. Perfect condition. Free delivery. PayPal accepted. Price £38.  
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**Dell Latitude E5420 i5 2.5 ghz,** 4GB RAM, 500GB hard drive, DVDRW, built in camera. Genuine Windows 7 64 bit professional. £150 plus £12 for next day delivery. Payment via Paypal or cheque or bank transfer, cash. Fantastic condition very fast.  
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Email: davethomas96@aol.com

**PC Desktop RAM (DIMM)** . 64MB Siemens PC100-322-620 MT8LSDT864AG-10CZ5. £8.  
Tel: Gordon (01314) 660205  
E-mail: scobieg09@gmail.com

**WD 3TB internal Hard Drive.**  
Excellent Condition, £65 inc P&P.  
Tel: Michael Cunnane (01452) 303732

**Netgear DG834N Rangemax**  
Next Wireless N Modem Router kit. Excellent condition complete with power supply, network cables, telephone cable, ADSL filter and setup CD. £10.  
Tel: David Ewles (01295) 253554  
Email: david@ewles.gb.com

**WD Internal SATA 3.5" 2TB**  
Hard Drive. Excellent Condition.

£37.50 included P&P. Flat screen monitors. Mainly 15" £20+p&p and 17" £30+p&p but have others on request. When packing I will make sure they have lot of padding to reduce risk of damage. Please email or call me for more information.  
Tel: David (01616) 888119  
Email: pcmadnessltd@yahoo.co.uk

**IBM Thinkpad T30 laptop**  
for spares or repairs. Excellent condition, but does not bootup. Not sure why. Could be an easy fix or for parts/spares. £15 plus P&P.  
Tel: Gordon (01314) 660205  
E-mail: scobieg09@gmail.com  
**Webcam (Trust Spacecam).**  
Boxed with CD of installation software and instruction manual. Perfect condition. £10.  
Tel: Gordon (01314) 660205  
E-mail: scobieg09@gmail.com

**For Sale: HP Photosmart C4585** All-in-One multifunction colour printer. Perfect condition. Includes software discs and manual. £20  
Tel: Gordon (01314) 660205  
E-mail: scobieg09@gmail.com

**Western Digital Cavier SE**  
Desktop Hard Disk Drive 160GB. In Perfect condition. Only £10  
Tel: Gordon (01314) 660205  
E-mail: scobieg09@gmail.com

Asus A8V motherboard, socket 939. Clips holding CPU cooler broke, CPU overheated & shut down. M/B should be OK and there is 4GB of ram on board. Free, collect only. North Wales.  
Tel: (01286) 678584  
Email: gw7hav@googlemail.com

**Toshiba Portage i5 laptop.**  
2.5GHz Model R830-13c 4GB RAM, 320GB HDD. Wi-Fi, fingerprint scanner, HDMI output. Sold on eBay for over £200; only £150 plus £15 p&p. Bargain. Great condition, and a very light device.  
Tel: Dave Thomas (07828) 982930 or (01942) 706571  
Email: davethomas96@aol.com

**DESKTOP HARD DRIVE.** 640GB Western Digital 3.5" SATA model WD6400AAKS. Perfect working

order. Partitioned and formatted. Only used as back-up drive. Free delivery. Price: £33.  
PayPal accepted.  
Email: geofry@tiscali.co.uk

**Seagate Barraucda 250GB SATA Hard Drive 3.5".** Tested and removed from a working environment. £12 inc Free Courier. Payment via PayPal.  
Email: info@jmcomputing.info

**AFX GeForce Nvidia 8800Gts**  
Graphics Card For Sale. £40.00 + Post. In perfect working order  
Email: ken.toole1@virginmedia.com  
**LAPTOP HARD DRIVE.** 160GB SATA 2.5". WESTERN DIGITAL. Model: WD1600BEVT. Fully tested. Perfect working order. Partitioned and formatted NTFS. Free postage. Price £22. Paypal accepted.  
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**DESKTOP HARD DRIVE.** 640GB Western Digital 3.5" SATA model WD6400AAKS. Perfect working order. Partitioned and formatted. Only used as back-up drive. Free delivery. Price: £33.  
PayPal accepted.  
Email: geofry@tiscali.co.uk

**4x 1 GB DDR2 RAM** (Ocz Nvidia SLI PC2 6400 epp 4-4-4-15) for Sale. £40.00 for all 4 + Post/Packing. In perfect working order.  
Email: ken.toole1@virginmedia.com

**Vintage Amstrad PC1512 HD20.**  
Colour Monitor 20MB Hard Drive 5.25 Floppy Original Amstrad Disks Manuals spare Keyboard and Mouse. This is a rare fully functioning collectable. £60.  
Tel: (01949) 876235  
Email: hc4203@gmail.com

**4x 1GB DDR2 Ram** (OCZ Nvidia SLI PC2 6400 epp 4-4-4-15). £40.00 for all 4 + Post/Packing. Perfect working order.  
Email: ken.toole1@virginmedia.com

**Corsair Vengeance 16GB (2x 8GB) DDR3 RAM**  
CMSX16GX3M2A1600C10. Never used. Selling due to wrong voltage, these are 1.5V and I needed 1.35V. Asking £85 inc. postage to the UK.

Email: [fabstock1@gmail.com](mailto:fabstock1@gmail.com)

**Laptop Hard Disk Drive.** Fujitsu. 20GB. Excellent condition: £10.00.  
Tel: Gordon (01314) 660205  
E-mail: [scobieg09@gmail.com](mailto:scobieg09@gmail.com)

**Corsair Vengeance 16GB (2x 8GB) DDR3 RAM**  
CMSX16GX3M2A1600C10.  
Never used. Selling due to wrong voltage, these are 1.5V and I needed 1.35V. Asking £85 inc. postage to the UK.  
Email: [fabstock1@gmail.com](mailto:fabstock1@gmail.com)

**HP Microserver n401 / windows 7 Pro / 4GB RAM / 400GB drive / MS Office 2003.** This HP n401 Microserver is in excellent condition and comes with Windows 7 re-allocated, activated & updated Feb 2015. Also installed is Minitools Partition Magic, MS Office 2003 HP basic, with codes/COAs. Buyer may have Linux Mint, or a completely bare drive. 2 spare drive frames. I have the original packing as per HP original delivery. So far as I can see, this Microserver will take 16GB memory and up to five drives. See it working before buying, (by arrangement). No refund under any circumstances. Collect from Harrogate, North Yorkshire. £140. Cash on collection. Delivery might cost £8 via Hermes, maybe much more to Highlands/Islands. Payment by Cheque OK subject to clearing, Paypal at £25 additional (to cover their fees).  
Tel: (07794) 528857  
Email: [it\\_central@ntlworld.com](mailto:it_central@ntlworld.com)

**CD Optical Drive** for installation in desktop PC Only £10.  
Tel: Gordon (01314) 660205  
E-mail: [scobieg09@gmail.com](mailto:scobieg09@gmail.com)

**Used Asus Wireless Router** for sale. Dual-band 4 x GB Ethernet Wi-Fi RT-N66U N-900. £65.00 O.V.N.O. Selling cause I have no need for it since upgrade to BT Home Hub 5.  
Email: [beme12355@googlemail.com](mailto:beme12355@googlemail.com)

## HARDWARE WANTED

**Trying to breathe life back into an old machine? Why not submit a wanted ad and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?**

**WANTED: Gigabyte GA-Z77X-D3H** motherboard.  
Email: [johnbeiry@gmail.com](mailto:johnbeiry@gmail.com)

**WANTED: PC Tower case (beige colour if possible)** to rehome an Amiga A1200 vintage computer. The Amiga motherboard is H 410mm x L 190mm (H 16" x L 7.5"). PSU not an issue but if available 250 watt more than enough.  
Tel: Bill (07742) 061569 or (02641) 769503.

**WANTED: Fractal Design Define XL** full tower case. R1 (original version) in black.  
Tel: (01670) 860146  
Email: [mm@tectron.co.uk](mailto:mm@tectron.co.uk)

## SOFTWARE FOR SALE

**Do you have old software that you simply don't use? Why not advertise with us?**

**Microsoft Office 2000 standard.** Upgrade retail box only PART NUMBER 021-02661 £15 NEW AND SEALED. This includes the following WORD, EXCEL, OUTLOOK, POWERPOINT. If you need an upgrade path I can supply one for free. Please add £3 for p&p.  
Tel: Dave Thomas (07828) 982930 or (01942) 706571  
Email: [davethomas96@aol.com](mailto:davethomas96@aol.com)

**Microsoft Project 2000 retail** boxed new unopened box. ONLY £20. Includes Microsoft Project Central and server software. Perfect to upgrading to the latest software at a fraction of the cost. Please add £3 for p&p.  
Tel: Dave Thomas (07828) 982930 or (01942) 706571  
Email: [davethomas96@aol.com](mailto:davethomas96@aol.com)

**Adobe Photoshop Elements** and Premiere Elements 12 Full Version - Windows/Mac. Original Boxed CD with unused product key. £47.50  
Tel: Ian (01932) 856971  
Email: [a2345@btinternet.com](mailto:a2345@btinternet.com)

**PCB design software** 127 layers, schematic entry, PCB entry, PCB to Gerber file converter, output to printer. £9.99  
Tel: Nigel Wright (07967) 527693  
Email: [cresswellavenue@talktalk.net](mailto:cresswellavenue@talktalk.net)

**Cyberlink PowerDVD 12 Standard.** Runs under Windows 8, 7, Vista or XP. Original CD with unused product key £7.50  
Tel: Ian (01932) 856971  
Email: [a2345@btinternet.com](mailto:a2345@btinternet.com)

**Microsoft Office 2013.** Original Software only £100.  
Tel: Gordon (01314) 660205  
E-mail: [scobieg09@gmail.com](mailto:scobieg09@gmail.com)

**Sim City 2000.** Boxed and original. Classic gaming. £15.  
Tel: Gordon (01314) 660205  
E-mail: [scobieg09@gmail.com](mailto:scobieg09@gmail.com)

## SOFTWARE WANTED

**Wanted: Instructions!** A couple of long shots, but does anyone have instructions for the TEXET T581 BN programmable scientific calculator or the ZOOSTORM Fizzbook NL2 model [not the one available on the net - wrong model]?  
Email: Alan Cox [alancox28231@gmail.com](mailto:alancox28231@gmail.com)

Wanted: PictureToExe software, for making picture shows.  
Tel: (01202) 610602  
Email: [ivor.mary@talktalk.net](mailto:ivor.mary@talktalk.net)

**Wanted: Quicken 2001 UK** Edition. I need to reinstall the program, but have lost my original installation CD.  
Email: [david.maddams@icloud.com](mailto:david.maddams@icloud.com)

## IMPORTANT BUYING ADVICE

**We work very hard to police our classified ads, and make them as secure as possible. However, please do your bit too and use the following guidelines:**

- **Never - NEVER** - pay by bank transfer or post out cash, unless you know the trader already, or are sure it is okay to do so. Pay by cheque, Paypal, Nochex etc wherever possible.
- Be wary of anyone who insists on you paying by the above methods if in doubt, get us to check them out by mailing [editorial@micromart.co.uk](mailto:editorial@micromart.co.uk)
- Keep copies of all correspondence
- When sending out goods, at the least obtain a certificate of posting from the Post Office

**If you are in any doubt, feel free to send us a mail via [editorial@micromart.co.uk](mailto:editorial@micromart.co.uk).**

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# ASK AARON



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Send your questions to:  
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Dennis Publishing  
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London  
W1T 4JD

Contact Aaron by email at:  
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

*Aaron*

## Sticking With 7

Looking at the Windows Update I see that there are nine updates to download. I am registered for the Windows 10 upgrade, but this is shown as optional and I have unticked this as I don't want it yet. However, when I try to download the Windows 7 updates it still tries to download the Windows 10 upgrade. If I allow the download will it automatically upgrade the computer or will it sit patiently on the hard disk waiting for me to activate it?

I only want the Windows 7 updates. How do I stop the 10 upgrade downloading? Thanks for your help.

**Roger**

*There's no need to worry about an unwanted upgrade to Windows 10. The update you're being prompted to download*

*is likely just the applet that can be used to download and install Windows 10, it's not the actual OS. Even if you have the app already, once downloaded, this simply sits on your Task bar, but Windows 10 won't be downloaded or installed until you instigate it.*

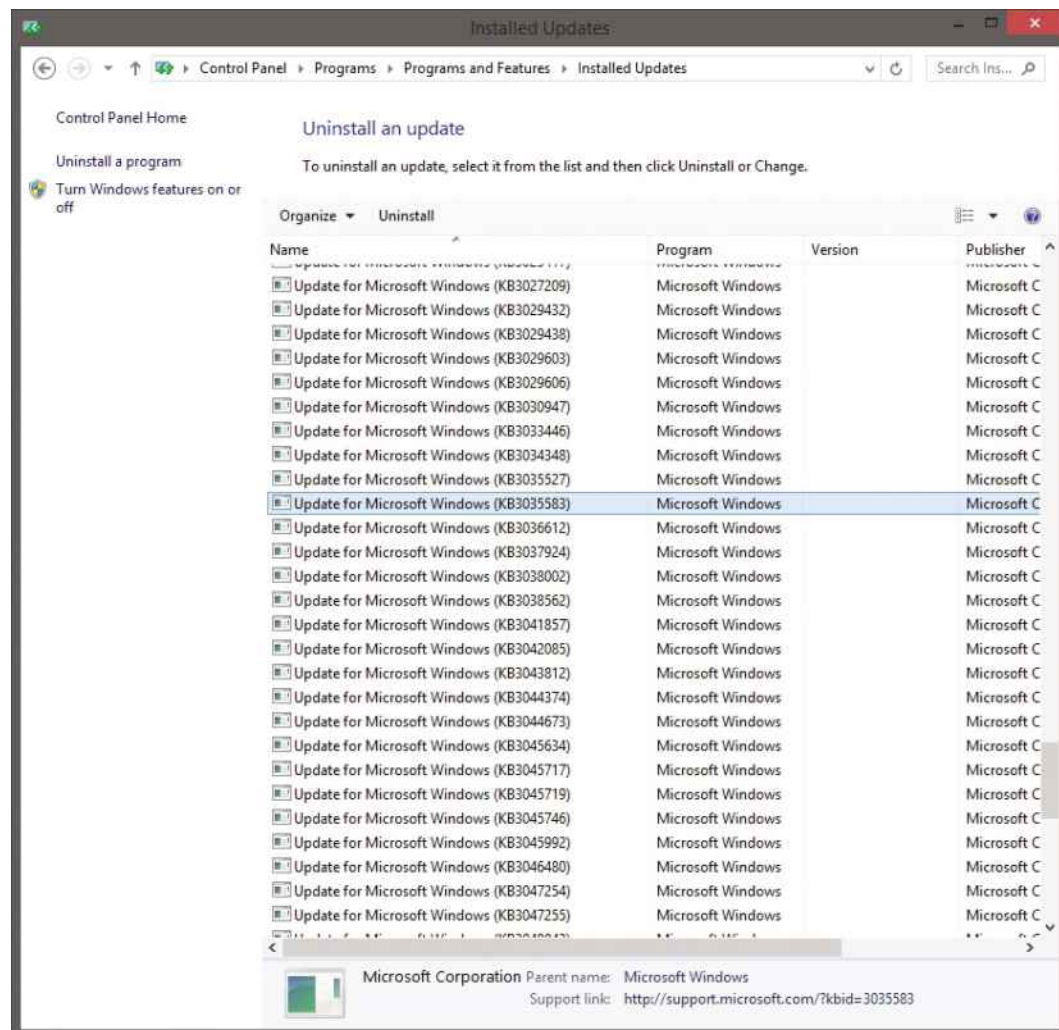
*it by simply going to Control Panel > Add/Remove Programs and then View Installed Updates. Locate the KB update in the list and uninstall it. Once it's gone, the Windows 10 app (also called GWX) should be gone too. In future, all you need to do is avoid*

“ There's no need to worry about an unwanted upgrade to Windows 10 ”

*The actual update that's responsible for the Windows 10 upgrade is KB3035583, and it's an optional install, so can be avoided if you don't want it. If you've already installed this, you can remove*

*downloading and installing this update, and Windows 10 won't bother you.*

▼ **Uninstall Windows update KB3035583 if you want to remove the GWX, Windows 10 app**



## Broken Link

Being retired, in my late seventies, and using my computers for office work, Internet, website building and maintenance, I have tested windows 10 preview, and my only real gripe was having to sign in with a Microsoft account. As I have to keep up to date with windows, I decided to upgrade my eight year-old laptop, which is used mainly for testing as my main computer keeps all the important stuff with a backup NAS.

The only upgrades the laptop has had are extra RAM, an SSD, and windows 7. I did the upgrade to Windows 10 myself using an ISO and the Media Creation Tool. The first surprise was that after the upgrade Windows only asked me to login with my local account, and has not demanded that I change to a Microsoft one. The boot time was very quick and I found I had no problem using windows 10. It was only after about six days that I came across an issue.

I am taking part in a trial that requires me to input details using a link supplied to me via an email. I discovered when I tried this under windows 10, although I was still using my e-mail accounts with live mail, I was unable to activate the link. After trying everything possible I opened the email on my main computer, which still runs windows 7, and was able to use the link without a problem.

I do not know if this a problem with Windows 10 or not, but I have decided not to upgrade my main computer until I can correct this. Any thoughts on this would be helpful

**Harold**

*I'm not sure what type of link you're trying to open, and what this actually involves (visit to a web page to fill in a form, running of*

*software, a simple confirmation, etc.), so it's hard to theorise on what the problem is here.*

*I'd usually first suggest you check to see if the link is valid and has no typos, then try to copy and paste the link into a browser instead of clicking it in the email. After that I recommend you try to forward it to another account, and/or open it in another mail client. However, I suspect you may have tried at least some, if not all, of these things already.*

*Links haven't really changed all that much over time, and there's no reason a link should work in Windows 7, but not in Windows 10, unless the results of that link do something very specific – such as opening a program or web script that has problems with the new OS. Again, as I don't know what the link is for, it's hard to advise.*

*That said, I have seen some people have problems opening email links within Office and Outlook (2003, 2007, and 2010). This seems to rear its head when trying to open links in Internet Explorer. Other browsers are apparently not affected.*

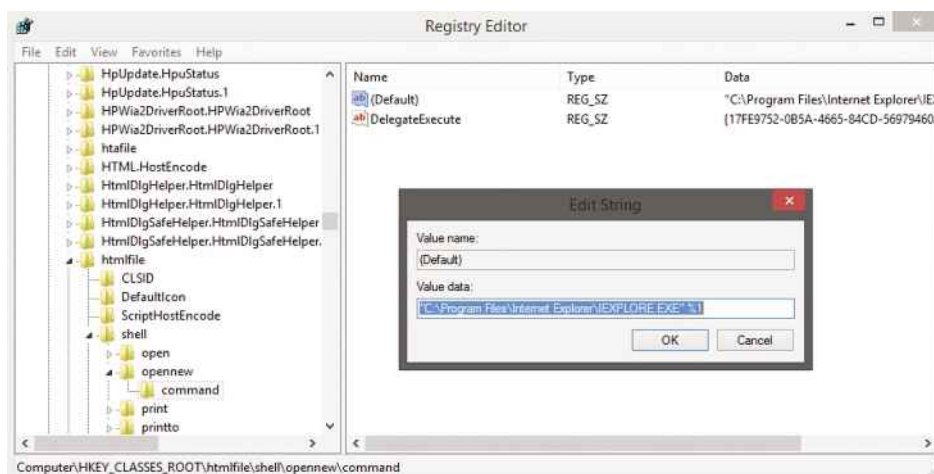
*A potential fix for this involves the Registry, and creating a new key. To do this, search for 'regedit' and run the Registry Editor. When open, navigate to HKEY\_CLASSES\_ROOT\htmlfile\shell and create a new folder under shell called 'opennew', and within this create another called 'command'. Change the default value of this by double-clicking the '(Default)' entry and entering (assuming C is your OS drive):*

`"C:\Program Files\Internet Explorer\IEXPLORE.EXE" %1`

*Once this is done, close the Registry Editor. A reboot shouldn't be needed, but can't hurt.*

*As the problem only seems to affect Internet Explorer, you may wish to simply move to another browser, such as Firefox or Chrome, and set it as your new default browser. This should also solve the problem.*

▼ **A simple Registry tweak can fix some email link problems in Windows 10**



## RAM?

How can I tell what kind of RAM my laptop uses? I have a decent laptop, but it's not got much RAM installed, so it's pretty slow. I think that I can upgrade or add some extra RAM to it to speed it up, but I don't want to put in the wrong type of RAM, as I'm worried that would damage it, or the RAM.

Can you help?

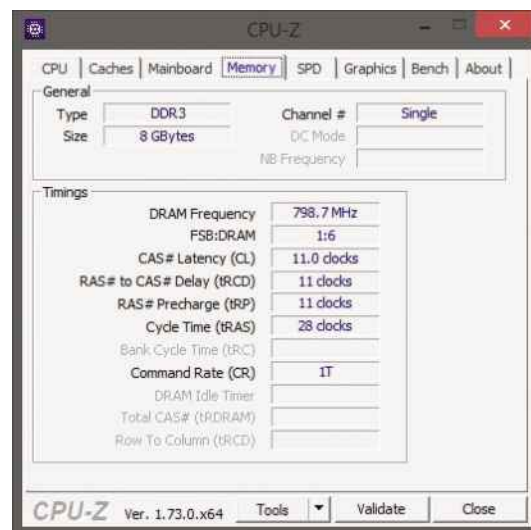
**Lee**

*Don't worry too much about putting the wrong RAM into a system. If it's wrong, you won't likely damage anything, the RAM just won't work, or the system won't boot up. That's all.*

*Aside from checking online at the manufacturer's website, to actually find out what RAM your system uses you could simply open it up and look on the RAM module itself, as the type and speed of RAM is usually printed on a sticker, or you could use a special program. Once such program is CPU-Z*

*You can get hold of CPU-Z from [www.cpuid.com](http://www.cpuid.com). This is system information software, and once you install and run it, you can view a plethora of information about your system, including the type of RAM.*

► **Need to know what RAM your PC has? Use CPU-Z**



# ASK JASON



Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

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Contact Jason by email at:  
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

## Jason

## All Work, No Play

I'm having trouble with my Orange San Francisco smartphone. It's got a few apps I've paid for, but I'm unable to upgrade them to the latest versions. I believe this is because the Play store itself needs upgrading, but I'm unable to do that, either. I just get error messages. Can you advise? Or should I give up and buy a new Moto G?

**Dave, BT**

The chief problem here is that the San Francisco has obsolete hardware. Its SoC (system-on-a-chip) is the Snapdragon S1 M7227, so the instruction set is ARMv6. All modern ARM-based SoCs employ ARMv7 (32-bit) or ARMv8 (64-bit). As I recall, Google abandoned support for ARMv6 way back in 2011, with the launch of Android 4.0 (Ice Cream Sandwich).

Another hurdle is that your 'Frisco will be packing Android 2.1 (Eclair) or 2.2.x (Froyo), which again are long past official support. There are numerous custom ROMs available, and some are built on Android 4.1.x–4.3.x (Jelly Bean) or even 4.4.x (KitKat). ROMs with any sort of stability, though, seem to top out at Android 2.3.x (Gingerbread). That's still far too old.

Even so, Dave, if installing a custom ROM is a path you'd like to tread, you should visit

[www.sanfranciscoandroid.co.uk](http://www.sanfranciscoandroid.co.uk)

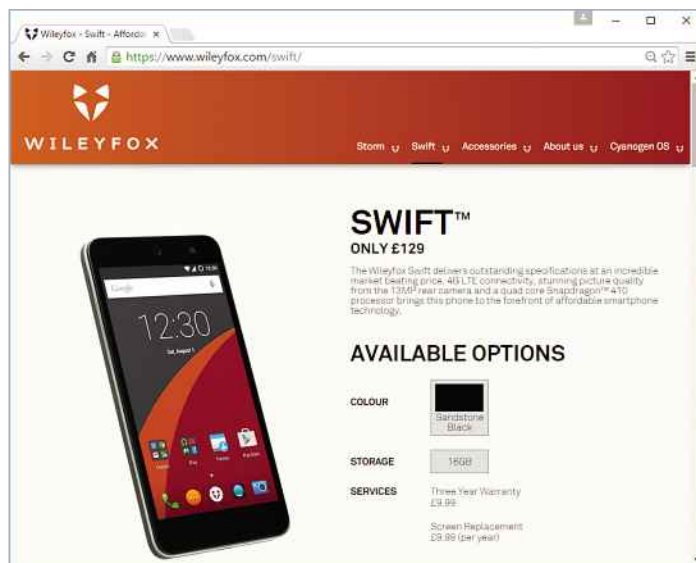
Bear in mind, though, that even if you do somehow manage to get sorted with a recent version of Google Play, there's no guarantee you'll succeed in reinstalling or updating all your current apps. ARMv6 devices now hold such a small slice of the market that most developers simply don't bother going the extra mile to support them. With its 600MHz CPU, Adreno 200 GPU, and 512MB of RAM, your Frisco is now also woefully slow. Sorry!

It really is time for a new phone. You mention the Moto G, and you can't go far wrong with the third-generation model (the latest one). There are two versions, though: one with 1GB of RAM and 8GB of

storage and one with double of both. The latter is the plum choice, especially as it's priced at £170. The scheduled release date is 22nd October, and it's worth the small wait.

There are plenty of other mid-range contenders in the market at the moment, however. New British outfit Wileyfox is gaining some deserved attention, and its Swift model – which is at least the equal of the aforementioned 2GB/16GB Moto G – costs just £129. Astonishing. It was meant to come out on 22nd September, but this has slipped to 16th October, which may well have been and gone by the time you're reading this.

▼ Form an orderly queue, please



## Bits And PCs

This week I have been mostly...

...Reading that the second-biggest UK seller on eBay – the king of cables, packaging materials, and dirt-cheap Chinese electronics – is allegedly in all manner of legal and financial difficulty, and it seems to have shut up shop (take a gander at [goo.gl/OYZHsY](http://goo.gl/OYZHsY))

...Playing hook-a-duck at the Statutes fair in my hometown of Burton (some say I'm far too old to be playing hook-a-duck, but when there's a stuffed Mr. Blobby on the one-win prize row, just take my money)

...Watching my business partner wielding a hot-air gun and attempting to replace the smashed back of a Sony Xperia Z2 (result: three attempts, two backs, and one dead phone)

...Listening to my lad's agonised sighs of despair at the death of the screen (again) on his Lenovo Y70-70 Touch gaming laptop (the original screen was faulty right from the machine's Christmas Day unboxing, so this new screen will be the third in barely nine months)

...Opting to forgo the Recaro seats (regular readers will understand)!



## What On Earth?

I can't get Google Earth installed. At first, after downloading the setup file, the error message was this: 'Google Earth needs administrator privileges to install.' I worked round that by locating 'googleearthsetup.exe' in my Downloads folder, right-clicking it, and choosing 'Run as administrator', but now I get a different error: 'The installer encountered error 1603.' What's going on? I'm using Windows 7, if that helps.

**Nigel, Gmail**

Error 1603 usually appears if Google Earth is already installed. Maybe someone else has tried to get it running before? Anyway, Nigel, open Windows Explorer and drill down to C:\Program Files (x86)\Google\Google Earth\Client.\*. Right-click the file 'googleearth.exe' and select 'Create shortcut'. Finally, drag the shortcut to your desktop. You should then be able to launch Google Earth without issue.

Why did the admin error appear, though? Well, by default, Google Earth sets itself up to work on all of a PC's user accounts (yours, your partner's, your children's, and so on). It therefore needs permission to tinker with accounts other than the one from which it's being installed (yours). Bad news for anyone not logged into an admin account or without a suitable password.

Luckily, there's an easy workaround. After clicking the Download Google Earth button on the download page, you'll see the privacy

policy. Underneath the scrollable text is a link labelled 'advanced setup'. Click this and untick the box labelled 'Make Google Earth available to all users' profiles'. You can then click 'Agree and Download', and Google Earth will install without saying a word.

\* In 32-bit versions of Windows, the path won't include '(x86)', and if it's the Pro edition of Google Earth that's installed, there'll be 'Google Earth Pro' rather than just 'Google Earth'.

**And you thought Microsoft had the monopoly on useless error messages!**



## Watching The Clock (Again)

In issue 1,382, Bob was having trouble with his media centre. "Recently, because of some niggles, I reinstalled Windows. I also updated the BIOS," he wrote. "Ever since, the PC will run for exactly one hour before freezing and then producing a BSOD and an emergency file dump."

He continued: "I've tested the RAM – all okay. I've also run 'sfc /scannow' at the command prompt – nothing amiss. What I did discover, though, was that Windows Media Center's TV guide sometimes showed the wrong programme times. I solved this by disabling Windows' automatic time-check. I'm still getting those hourly BSODs, however."

In reply, I suggested downgrading the BIOS to the version in place previously and that Bob should replace the motherboard's CMOS battery. I also thought one of his two TV cards could be to blame, and recommended testing them individually and installing different drivers. Then, I finished with this: "Are you running any scheduling software in addition to Media Center? Maybe this is configured to update its programme guide every hour – Media Center itself could be, too. You'd do well to uninstall anything related to the TV cards except their drivers, and make sure Media Center's updates are set to manual."

Well, Bob's been in touch and it appears I couldn't have been more wrong if I'd told him to chuck the lot away and get down to PC World...

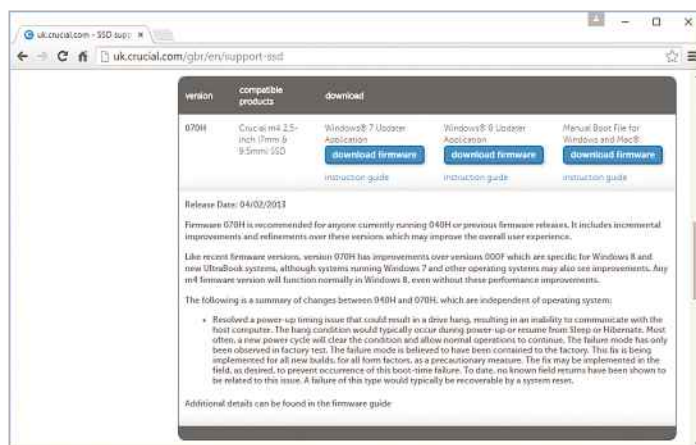
I've discovered the cure! My better half trawled through online forums and found someone who'd had exactly the same problem. If you recall, I'm running a Crucial M4 SSD (64GB, model M4-CT064), and apparently the original firmware on M4s has a bug that causes hourly crashes once a drive's reached 5,184 hours of operation. Since updating my drive's firmware to version 070H, my troubles have vanished!

**Bob Valleley, via email**

The shame. The shame! I knew this, Bob. I knew this! Stone me if I didn't write about Crucial M4 firmware problems in issue 1,259. Admittedly, that was over two years ago, but how could I forget? When I read something, I file it away, ready for future retrieval. I hardly ever forget. This total oversight has shaken me. All the clues were there in your original email, but not a single synapse was triggered. Am I getting old?

Anyway, I apologise for leading you down the garden path. I'm just glad you got to the bottom of the problem in the end. And thank you – I think – for writing back in. For anyone else with an M4, head to Crucial's SSD support page: [goo.gl/QB95x3](http://goo.gl/QB95x3). Download and install the update tool, and if your firmware shows as anything other than 070H (which remains the latest version), update.

▼ **Not quite everyone has forgotten about this**



# Crowdfunding Corner

This week, it's our semi-regular look at the strange and exciting games coming out of crowdfunding platforms. This week, two games you probably wouldn't find on either of the big consoles...

## Top Secret

Inspired by the real-world events in the case of Edward Snowden, *Top Secret's* branching narrative takes you into the heart of the NSA with an intriguing and tense interactive fiction game. You play a fresh recruit tasked with tracking down the person who's leaking documents to the press, and by using surveillance techniques and deciphering intelligence, you have to bring them in – even if it means putting your friends in danger.

The Kickstarter page offers a playable demo of the final game. The story will unfold in real time and can be played over email, encouraging immersive roleplay, or digitally in an offline version, which uses a fake email inbox. For added immersion, you can even play the game using PGP in the exact same way Edward Snowden did. All you need to play is an email account and/or access to Windows, Mac or Linux for the DRM-free digital copy.

Created by a UK developer, the project looks set to reach its £8,000 target, and a copy of the game costs just £5, with completion due in May 2016. £8 gets you early access, and higher tiers come with a number of rewards, including physical items like posters and T-shirts, access to the launch party and the ability to add content into the game itself. It's fair to say it looks like it'll be a unique and intriguing experience, and that alone should make it worth your time and money.

**URL:** [kck.st/1P7KhJm](http://kck.st/1P7KhJm)

**Funding Ends:** Friday, 23rd October 2015

## Home Free

Sick of playing the same old open-world experiences? Well, it's fair to say this one isn't that. *Home Free* is an open-world action-RPG in which you play a lost dog exploring a randomly generated city. Using your canine abilities, you beg, forage and steal to find your place in the world. Choose from over a dozen breeds in numerous different colours.

The narrative is player-driven and designed to help you appreciate life from the dog's perspective. Master the set of canine moves and learn the rhythms of the city. When is garbage put out? Which parks empty at midday? How will you feed yourself? All these decisions and more must be made.

The game has been in development for two years now and is due out this time next year. A DRM-free copy of the game can be acquired by backing the project for as little as \$15 (£10), but higher tiers get you the soundtrack, a T-shirt and even the opportunity to appear in the game as one of the low-poly human NPCs. For \$2,500 (£1,600) both you and your dog can appear in the game, *and* you get a free minigame starring you both. Surely there are some dog-lovers around who can't resist that?

**URL:** [kck.st/1j4TK8d](http://kck.st/1j4TK8d)

**Funding Ends:** Friday, 30th October 2015



**Disclaimer:** Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

# App Of The Week

## CloudCal and CloudTasks

This week, David Hayward gets productive with a pair of apps

**M**anaging time can be difficult. Many busy people rely on a diary or some form of calendar notification built into their email client, while others take a more mobile approach. The problem, though, with the mobile side is trying to find an app that is easy to use, neatly ties everything together and still offers you a handy format via which to visualise your schedule.

### CloudCal And CloudTasks

The London-based startup Pselis may have the answer for you in the form of two of its leading apps: CloudCal and CloudTasks. The first is an organisational and productivity calendar that is designed to help you see your busy schedule in a manner that's both effective and efficient. It uses a concept it calls Magic Circles, which will turn every day in your calendar into a clock face to give you a visual breakdown of the events you have planned for that particular day. For example, if you have an all-day event, such as a birthday, on the second of the month, then that day will have filled 24-hour clock face, but will also be broken further down to include timed meetings and personal arrangements.

The outer area of the clock face, circling the day in question, is where the various individual meetings will be highlighted by the app, they will be shown in different colours and in segments corresponding to the start and end times, according to the information you've entered into your schedule.

It's fully customisable, with various views and so on and includes an interface that can fully sync with Outlook, Exchange, Gmail and Google Calendars. There's an option to include maps, directions, invites and even attachments relating to the meeting or event.

The other app from Pselis, CloudTasks, is a fully featured to-do list that is a good companion to CloudCal. With it, you can organise your day(s), set meeting goals, enter a shopping list and generally help better manage your life – all in an easy to use task manager interface. It's easy to sync with Google Tasks and the aforementioned CloudCal; you can break each task down into sub-categories and even filter and sort the various events to a more personalised setting to help you maximise your workflow.

### Features At A Glance

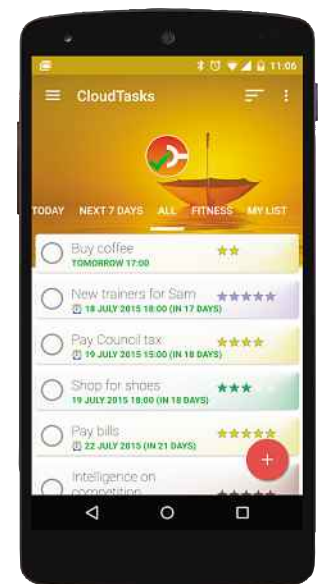
- Utilises eye-catching 'Magic Circles' help break each day down into a readable format.
- Both apps sync with Microsoft products, as well as Google's own productivity tools.
- The apps are high personalised and can be further tweaked to better suit your needs.
- All your data is stored securely.

### Conclusion

Both apps are free to download, and with an initial bit of effort expended on setting them up and some time shaping them to fit in with to your own workflow and visual preferences, they really work a charm. So if you're one of those ultra-busy individuals, who has each day packed with a seemingly endless succession of meetings and other sundry tasks, and you're finding your current notification and calendar management program a little inefficient and difficult to get along with, this pair of apps could well be the ones for you.



Using Magic Circles, you can break each day down for easier viewing



▲ CloudTasks makes task management extremely easy and effective



# Logging Off

**W**ith both Apple and Google launching new streaming devices recently, the shift away from network TV is in full swing. Streaming is the future, which bodes well for those like Netflix and Amazon leading that charge.

Or rather it would if one of those companies just didn't do something so mind numbingly stupid that Homer Simpson could have devised it.

Clearly annoyed that its new FireTV product had been overlooked by arguably more successful products, Amazon has decided to ban the sale of both the Apple TV and the Google Chromecast from its store.

By way of explanation, it crafted an imaginative piece of nonsense to justify it, which it sent in an email to those resellers affected by this change.

"Over the last three years, Prime Video has become an important part of Prime. It's important that the streaming media players we sell interact well with Prime Video in order to avoid customer confusion."

The confusion it's talking about is that neither of these devices supports Amazon's Prime Instant Video service. And the way that appears to play at Amazon is that if you don't support our service, then we won't sell your boxes, doesn't it?

However, Amazon is having some sort of existential crisis here, because the only reason that the Chromecast doesn't support Prime streaming is because Amazon hasn't bothered to use Google's open APIs to write an interface. This is presumably because it thinks it will sell more FireTV devices if it chooses not to. I can't believe Amazon is seriously expecting Google to write the code for it. Or is the 'confusion' here one that exists only in the minds of Amazon execs, who'd like to eat their streaming revenue and box shifting cakes too?

This, however, is a deep rabbit hole, which once entered could take Amazon to places it hadn't expected. Where next?

Does it imply that it soon won't sell smart TV's that don't support Prime and those game consoles that don't either? That's the problem when you pull on an errant piece of wool, because not long afterwards your entire sweater has unravelled.

Quite what Amazon thinks it's achieving here is a complete mystery to this writer, because the reality is that FireTV represents less than 1% of the market for stream management devices. Making people go

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directly to Google and Apple for their devices does

nothing for the Amazon bottom line and is highly unlikely to cause a massive reversal of fortunes for the FireTV.

While Amazon was cooking up this PR fiasco, it also launched the new Fire tablet, a 7" tablet for just £49.99. That sounds like a great deal until you realise that this Android tablet doesn't have access to the Google Play store and is in fact an electronic shopfront for you to buy things on Amazon.

There was a time when stores actually gave their catalogues away free, but now it seems that Amazon can get people to actually buy theirs. Admittedly if you buy music or TV, you can also consume that content through the tablet, but there's a fine irony in getting people to pay to spend more with you.

I can't see this ending well, because it's patently a restrictive trade practice that could attract an anti-trust investigation. Amazon therefore shouldn't be overly confused when that happens.

*Mark Pickavance*

### LAST WEEK'S CROSSWORD

**Across:** 7 Codicological, 8 Escape, 9 Uganda, 10 Ladette, 12 Yodel, 14 ETOPS, 16 Air Mile, 19 Adults, 20 Payoff, 22 Psittacosauri.  
**Down:** 1 BOTS, 2 Finale, 3 Rosetta, 4 Locus, 5 Mikado, 6 Hard Sell, 11 Autodesk, 13 Simpson, 15 Polity, 17 Mayday, 18 Isaac, 21 Fire.

#### DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. If you've ever been paintballing, you'll probably be aware of how much it can hurt, particularly if you're hit at close range. Well, we've been invited to play a bit of airsoft, which in common with paintballing, involves trying to shoot other people with a pretend gun. There are few key differences, but the main one is probably that you

shoot little plastic balls at each other instead of paint. What's not so different is the fact that it can really hurt, apparently, so we've been looking at airsoft injuries on YouTube. Most of them seems to involve people not wearing the correct safety equipment and finding little balled lodged under their skin. Painful, yes, but nothing compared to another video we started watching, in which we saw some on top of building backing away with an airsoft sniper rifle, only to back right off the edge and fall straight down. At that point we stopped watching, wrote up a will and seriously considered whether or not we should be doing this stuff at our age. Our conclusion: probably not, but that's never stopped us before. See you next week. Hopefully.

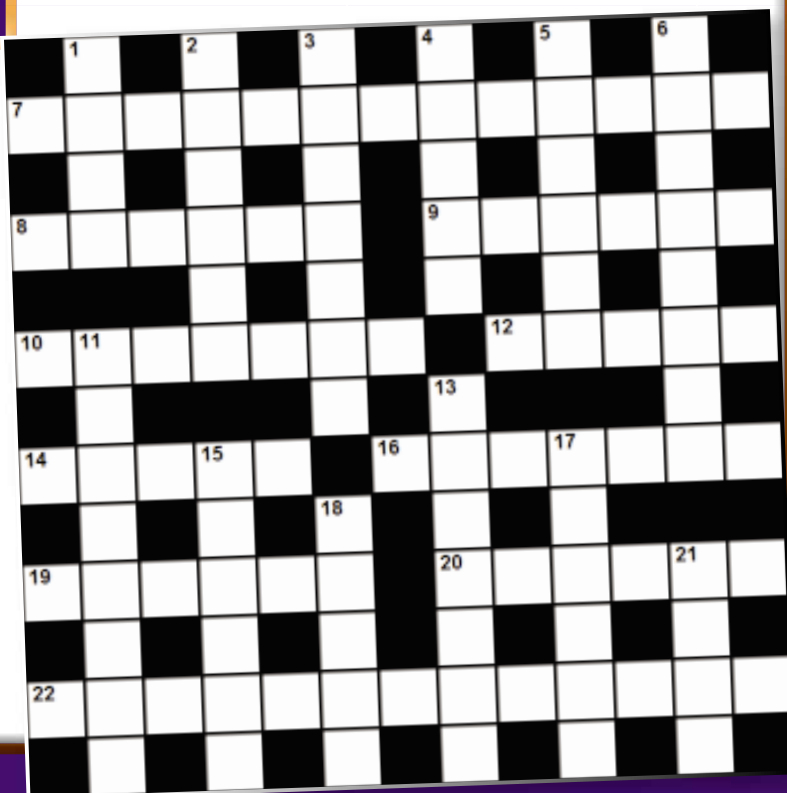
### THIS WEEK'S CROSSWORD

#### Across

- 7 In mathematics, a variable that has zero as its limit. (13)
- 8 Bring into harmony with. (6)
- 9 A well-paid middle-class professional who works in the city and has a luxurious lifestyle. (6)
- 10 A distant planet of the solar system, eighth in order from the sun, discovered in 1846. (7)
- 12 A British charity founded in Oxford in 1942, dedicated to helping victims of famine and natural disasters. (5)
- 14 Consuming something after this specified date could put your health at risk. (3,2)
- 16 Microsoft's System Preparation Tool for Microsoft Windows operating system deployment. (7)
- 19 A section of a web page that can act as the container for a second separate page or resource. (6)
- 20 The Roman goddess of the dawn; counterpart of Greek Eos. (6)
- 22 The supposed alchemical process of changing base metals into gold. (13)

#### Down

- 1 Unit of speed equal to one nautical mile per hour. (4)
- 2 Stately ballroom dance for two in triple time. (6)
- 3 Carried by bomber crews in WW2 to send a message home in the event of forced landing or ditching. (7)
- 4 .ke TLD. (5)
- 5 Brand name of a white fluid used to paint over a typewriting error so it can be written over again. (6)
- 6 Check an XML document to confirm that it both is 'well-formed' and follows a defined structure. (8)
- 11 Shaped like a sword blade; long and narrow with sharp edges and a pointed tip. (8)
- 13 A succession of people from the same family who play a prominent role in business or politics. (7)
- 15 The 'Thunderbird' who designed most of the organisation's high-tech vehicles and equipment. (6)
- 17 A measure of the absence of contaminants in a substance. (6)
- 18 Conditions under which an action may be undertaken or agreement reached. (5)
- 21 The value of an unknown quantity satisfying a given equation. (4)



# In Next Week's Micro Mart\*

- Hands on with the Raspberry Pi touchscreen
- Do website paywalls really ever work?
- The world's most expensive software errors
- Plus the usual mix of news, reviews and advice



\* May be subject to change



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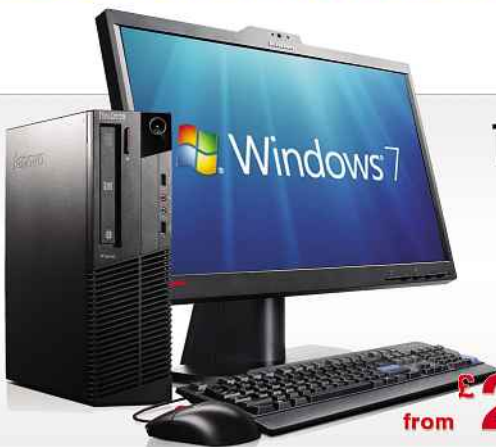


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